LAFAYETTE KT-550 POWER AMPLIFIER KIT

The KT-550 is a 100-watt (50 watts per channel) stereo power-amplifier kit. Without question this kit is a prime example of the recent trend towards more powerful amplifiers and quality without compromise. We have taken notice of this latter trend several times in the recent past; it is certainly natural that we take special cognizance of things we like. Indeed, and in fact more important, the consumer has also shown approval for this trend. In any case, the KT-550 is an excellent amplifier which builds easily, certainly within the capabilities of almost any constructor.

As a side note we would like to point out that the KT-550 is most attractive in appearance. Normally when we think of such a functional instrument as an amplifier, we are not interested in its appearance. This is especially true since most of the time amplifiers are placed in some cubby-hole where they will not be seen. Be that as it may, this particular amplifier with its two-tone brown body and gold instrument panel is quite handsome in appearance, and deserves mention even though it be forever more hidden from sight. At least, when you *must* service it, there will be some joy in looking at it.

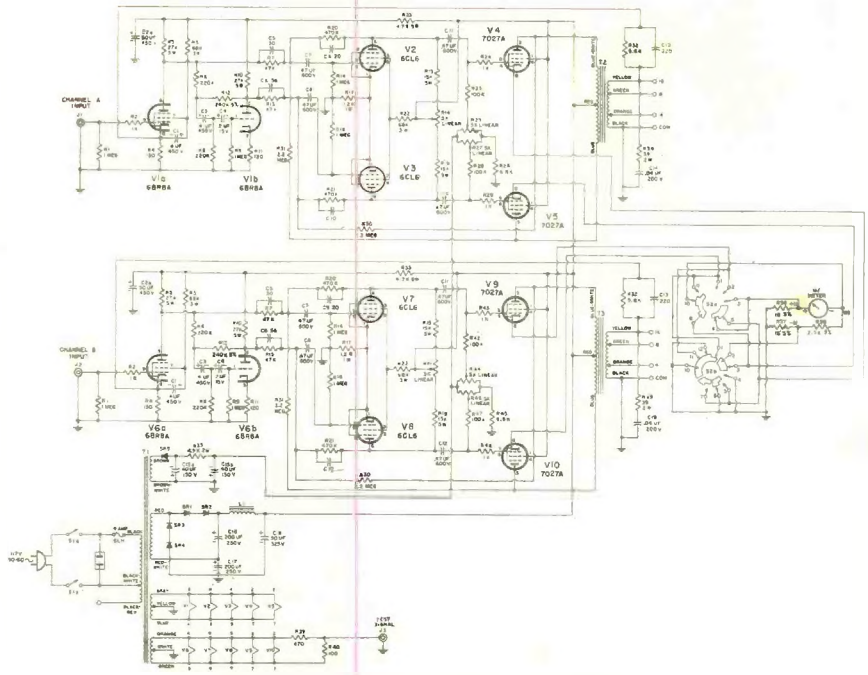

Fig. 3. Over all schematic of KT-550.

Circuit Description

One of the important new developments which has contributed greatly to the quality of recent amplifiers has been the use of multiple feedback loops. In the past the feedback consisted of a single loop, usually from the voice coil back to the input stage of the amplifier. With this technique the amount of feedback usually was limited to about 20 db. Higher amounts of feedback, which of course would reduce distortion, would also cause the amplifier to become unstable. With multiple-loop techniques, however, if one stage has twice the distortion of another, twice as much feedback is applied around it. This permits the use of larger *total* feedback without sacrificing stability. In the KT-550 six feedback loops are used with a total feedback of over 50 db. Referring to the schematic, *Fig.* 3, we will trace a signal as it proceeds through Channel A. The input signal enters at J_1 and is fed to the grid of the pentode section V_{1a} (a 6BR8A) which acts as a voltage amplifier. The output of V_{1b} is connected to the grid of V_2 (6CL6) one of the driver tubes. The output of V_{1a} is also connected to the grid of V_{1b} (triode section of 6BR8A). V_{1b} is adjusted by means of plate-to-grid feedback to provide a gain of unity. The signal appearing at the output of V_{1b} is therefore equal in level to the signal fed to V_2, but 180 deg. out of phase. This reversed-phase signal is then applied to the grid of the other driver tube, V_3. The outputs of tubes V_2 and V_3 are fed to the grids of the push-pull power output tubes V_4 and V_5 respectively. The newly developed 7027A beam-power output tube is used with fixed bias. To compensate for changes in tube parameters, and to avoid the use of matched pairs, an indicating meter and bias and balance controls have been incorporated. Bias controls R_{25} and R_{27} can be adjusted to provide the proper indication on the meter which will ensure that V_4 and V_5 are drawing the same amount of current. In this manner both tubes are made to operate at the same quiescent point, and are therefore "d.c. balanced."

Dynamic or "a.c. balancing" is accomplished by adjustment of R_{16}. The control changes the plate loads of V_2 and V_3, causing the voltage at the grids of V_4 and V_5 to change correspondingly. During adjustment the meter is connected across the two cathode resistors R_{36} and R_{37}. If the tubes are perfectly balanced when an a.c. signal is applied to the input of the amplifier, the meter will indicate zero. A 60-cps 20-watt test signal is supplied from a test jack at the rear of the chassis. All bias and balance controls are conveniently located on the front panel of the amplifier. The power supply consists of four silicon diode rectifiers in a voltage doubler circuit, and a fifth silicon diode and an R-C filter provide rectification and filtering for the bias-voltage supply to the output tubes of both channels.

Fig. 2. Lafayette KT-550 power amplifier.

Construction

The KT-550 is an unusually easy amplifier kit to construct. This is the result of the use of printed circuit boards for the major portion of the wiring. As a result of the reduced amount of soldering and wiring it took us just a shade under six hours to construct this kit. This came to two nights' work in practical terms.

A contributing factor to the extremely easy construction is the manual accompanying this kit. It is certainly one of the most concise, clear, and easy-to-understand manuals that we have encountered for a power amplifier kit. Of special value in this manual are the pictorials and instructions describing how to solder connections to switches and to the printed circuit board. These are areas where the novice constructor commonly has difficulties.

On the whole the manual is excellent, as we noted, but we did discover four or five inaccuracies although they were of the sort which are easy to detect during construction. There was one error (not in the manual) which was somewhat more serious however. We discovered that a hole had not been drilled in one of the circuit boards. Although this was not especially serious for us—we just went ahead and drilled a hole with the proper size drill—the novice, however, would probably be quite alarmed especially since most of the components had already been mounted to the board by the time this was discovered. The novice would probably hesitate before drilling for fear of ruining all the work that he had done up to that point. We don't blame him.

Although not of vital importance, we would recommend that kit manufacturers include the plastic nut starters which are included in one manufacturer's kits. They could not possibly cost more than a few pennies, and yet they are probably the

most convenient tool we have found for mechanical assembly. We recommend this as an inexpensive way to the "heart" of the kit builder.

Performance

The published specifications for the KT-550 are unusually fine, well up amongst the top-quality amplifiers available. This amplifier met every one of its published specifications. For example, we found frequency response from 20–30,000 cps to be within 0.25 db at 50 watts output. Harmonic distortion was 0.12 per cent at 1,000 cps and 50 watts output. We measured IM distortion at 0.4 per cent, and hum and noise at 90 db below 50 watts.

In view of the excellent performance and easy construction, we would recommend this amplifier to any audiofan who is willing to pay for performance.