

# The DenTron GLA-1000B Linear Amplifier

BY JOHN J. SCHULTZ\*, W4FA

Linears using TV-type sweep tubes have certainly had their ups and downs since s.s.b. became popular. The list of advantages and disadvantages of linears using such type tubes versus linears using "transmitting" type tubes can become mighty long. If money were not a question, most amateurs, including the author, would in the final analysis choose an amplifier using "transmitting" type tubes such as the 3-5002, 8873 family, etc. However, on the other hand, it has been well proven that TV-type sweep tubes when properly used in a linear can provide reasonable performance in terms of power output, distortion and reliability at an economical price. The DenTron GLA-1000B is a commercial linear that well supports this argument.

The GLA-1000B is a self-contained linear amplifier with built-in 110/200 volt a.c. power supply for 80-10 meters. Because of the present unfortunate FCC regulations, it has to be sold as a 80-15 meter amplifier. However, a simple and economical (\$5) modification kit is available from DenTron to licensed amateurs to expand its coverage to include 10 meters.

The first impression one receives of the GLA-1000B is that of a "heavy" unit although it weighs only 24 lbs and measures far less than a cubic foot (5 3/8 x 11 x 11 inches to be exact). Perhaps one just expects a TV-tube linear to be a light-weight! The basic construction of the linear is quite rugged. Steel front and back panels are joined together by a chassis plate. Then heavy rolled and perforated steel top and bottom covers are used to enclose the amplifier. Most of these details can be seen from the photographs, although in the top view the top cover has been removed. The front panel controls are well arranged and use nicely dimensioned knobs.

\*c/o CQ Magazine



Front view of the GLA-1000B. The top cover has been removed temporarily.

The basic circuitry of the GLA-1000B is shown in fig 1. Four type D-50A (6LQ6) tubes, which have been factory matched, are used in a conventional grounded grid circuit. The output circuit is a pi-network type and there is a separately switched pi-network input matching circuit for each band. The inclusion of the latter networks is the main difference between the GLA-1000B and the old GLA-1000A. These networks allow the linear to present an almost constant 50 ohms input impedance to the exciter such as a "no-tune" solid-state transceiver. As a bonus, they also add an extra bit of harmonic attenuation to the output of an exciter. The power supply is a straight-forward bridge rectifier type with a total of about 33 mf output filtering.

A switched meter allows for the monitoring of plate voltage, plate current and relative r.f. output. LED status indicators show whether the linear is just turned on (standby) and whether the relay line to the linear has been keyed (transmit). A cooling fan runs continuously to suck out air from the D-50A tube envelopes. All in all, the circuitry is similar to that used for TV sweep tube linears for the last 20 odd years. The only thing significantly different, and a point which might be picked up by home-brewers, is the use of a zener diode, D1, to provide bias. In this case, it is a 24 volt/50

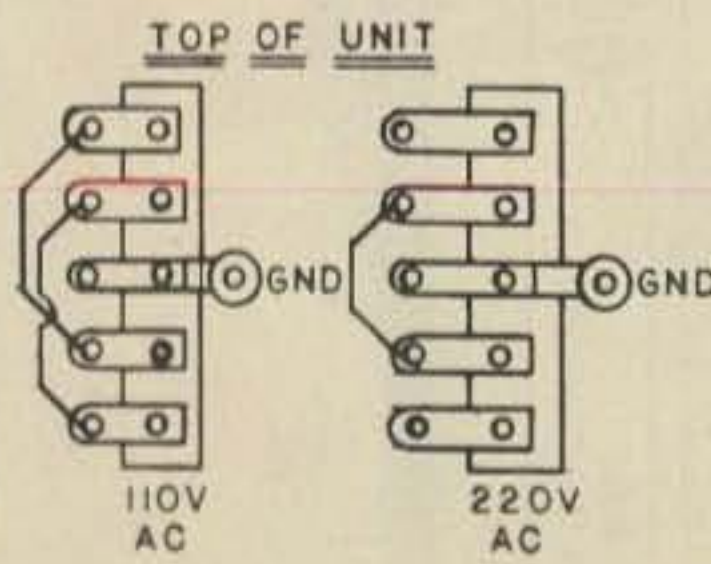
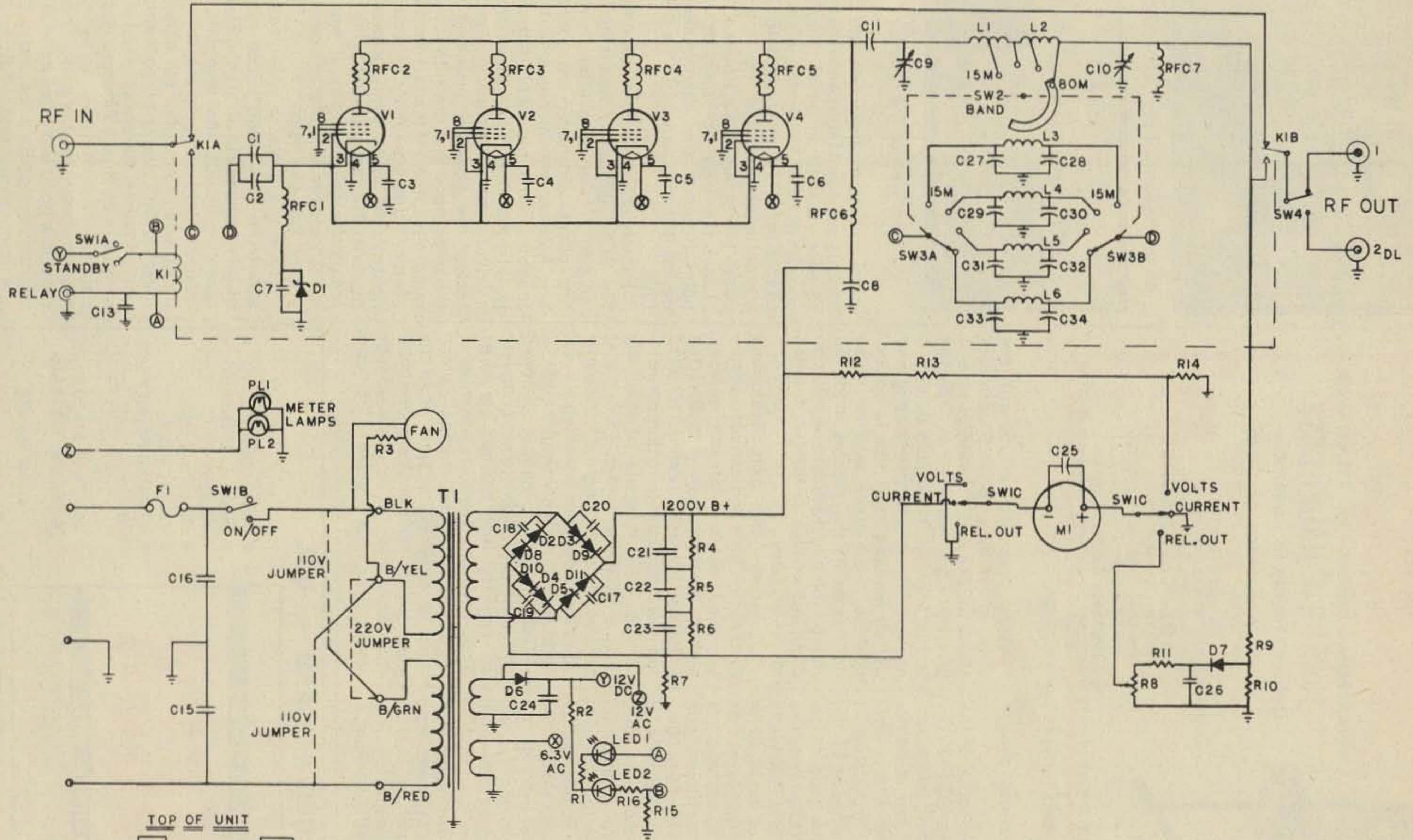
watt zener but it saves having to provide another transformer winding and/or rectifier/filter circuit for the bias supply.

Considering the price of the linear, the execution of the circuitry is very neatly done with good quality components. The top view shows the interior of the linear with the power supply components grouped on the left and the r.f. components on the right. All of the components are mounted on either the chassis plate or on the front or rear panels except for components associated with two PC boards. One PC board is used to mount the tube sockets and plate choke. Another one is used to mount the rectifier diodes and filter capacitors associated with the power supply. A wide spaced transmitting type variable is used for the plate tuning capacitor while a three section BC type capacitor is used for loading. The pi-network coil tap switch as well as the dummy load selector switch are well dimensioned and appear to have steatite insulation. A small board to the left of the coil tap switch holds the fixed-tuned input pi-network circuits for each band. They are switched by a separate section on the coil tap switch. The meter used is larger than usual and with its green back-lighted scale makes for very easy reading of plate voltage, plate current or relative power output. There is a potentiometer mounted on the back panel so one can externally adjust the meter reading for relative power output. As DenTron suggests, this can be a useful aid to avoid overdrive of the linear. When loaded for full c.w. power input, the relative output meter reading is set for full scale. Then when operating s.s.b., the exciter microphone gain control is adjusted to limit meter deflection to about one-half scale on voice peaks. Finally, to complete the look "inside", one should mention the power transformer which has the "danger" sign on top. It is a very husky transformer and must account for more than half the weight of the linear—quite contrast to the skimpy



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Fig. 1—Schematic diagram of the GLA-1000B.



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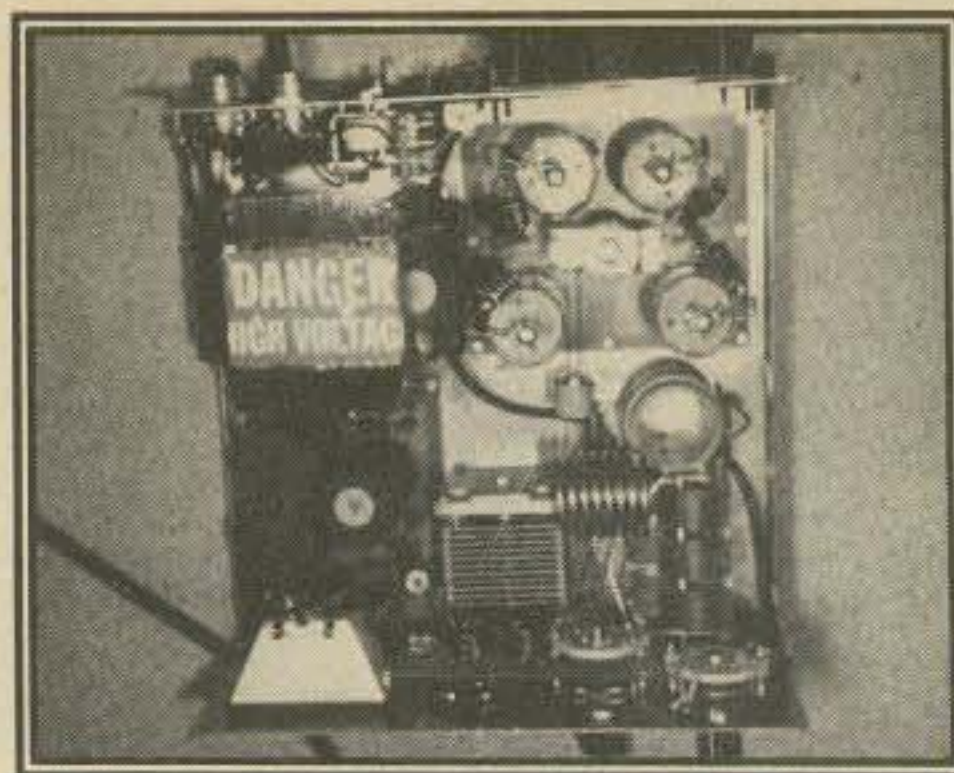
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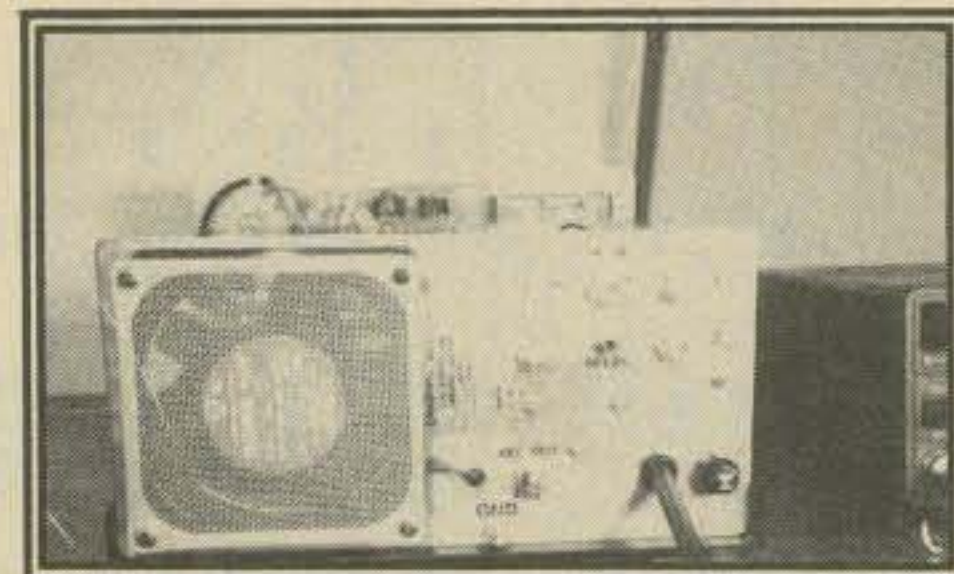
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An inside view of the GLA-1000B.



Rear view of the linear.

TV type transformers one often sees in home-brew linears.

The rear view shows some of the construction techniques. SO-239 connectors are used for all r.f. in/out connections. The exhaust fan is particularly well dimensioned and is well screened for r.f. shielding purposes.

The electrical performance of the GLA-1000B matches its good mechanical construction. The amplifier is rated at 800 watts c.w. and 1200 watts PEP input on 80-10 (when modified for the latter band). This input level was easily achieved using 80-100 watts of drive. The power output efficiency on c.w. and s.s.b. ranged from 55 to 60%, dropping off a bit on the very end of 10 meters. IMD measurements on a high-power linear can be complicated because one must take into account the IMD products from the exciter used. The measurements made may be a bit on the conservative side but they indicated — 30db third order IMD products on all bands except the high end of 10 meters where it fell to — 27 db. These IMD specs are better than one finds with the usual sweep tube linear but not as good as can be achieved with tubes especially designed for linear amplifier service.

Actual operating results with the linear driven by a TS-120S were very pleasant. The linear is easy to tune, it provided a definite boost as expected to the barefoot TS-120S's output, it showed no signs of overheating and the air exhaust fan noise is not noticeable. Also, there was no noise noticeable in the receive mode although there is no provision for complete cut-off bias to the D-50A tubes during standby.

Obviously, the antenna/dummy load switch provided can also simply be used as an antenna selector switch. Another feature is that the linear can be easily modified for all of the new h.f. bands when they come into use. Also, it would be relatively simple to add a built-in s.w.r. meter function by modifying the front panel selector switch and installing a s.w.r. sensing bridge or sensing circuit.

The operating manual supplied with the GLA-1000B is quite complete as regards instructions, diagrams and a parts list. There are a number of precautions in the manual which must be observed. In spite of all the good qualities of this linear, one must remember that it is a sweep-tube linear. One must allow 3 minutes

warm-up time for the tubes and continuous key-down time cannot exceed 15 seconds with an equal length of cool-down time. The linear might be usable for RTTY at some quite low power input level but the manual doesn't even suggest a figure. If one abuses the linear obviously one can harm it since the only protective device it incorporates is an a.c. line fuse.

Factory service is quite responsive. The GLA-1000B which was tested developed a fault soon after delivery. The idle plate current jumped up to a few hundred milliamperes and the tubes started to glow a bit. Apparently, D1—the zener diode shown in fig. 1— had shorted. The factory was contacted, the situation explained and the offer made that the author would replace the diode if the factory would send one and if such action would in no way void the warranty (a usual 90 day one). The diode arrived in the mail practically the next day, it was installed and the amplifier has been operating fine ever since.

There are a lot of nice features about the GLA-1000B which cannot all be mentioned in an article. The engineering thought that went into it is interesting to contemplate. It is not an expensive amplifier but care was taken to put quality components at critical points. Care was taken in assembly to do things like scraping the paint away from screw holes where the top cover joins the bottom one to provide a good electrical bond. All in all, considering its price and quality, the author would rate the GLA-1000B as one of the best commercial sweep-tube linears to come on the market.

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