

Fig. 1. Performance curves for the XA1-320 "convertible" amplifier.



Fig. 2. General Electric Model XA1-320 in metal "table-top" housing.

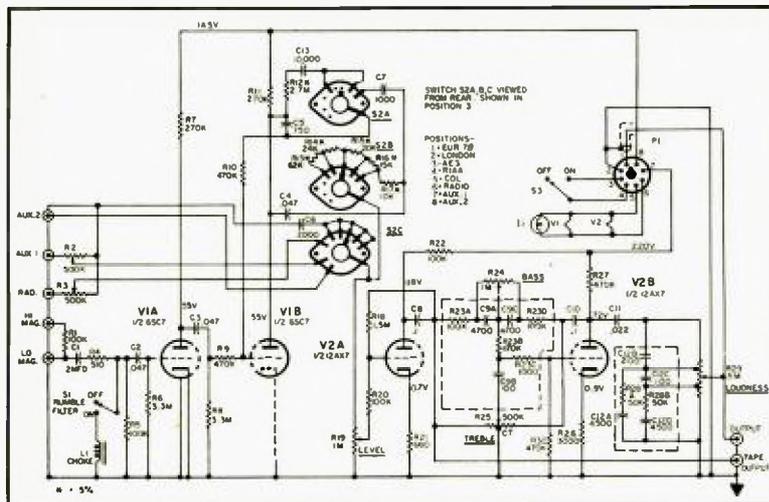


Fig. 3. Schematic of the preamp section of the XA1-320 amplifier.

General Electric Model XA1-320 20-watt amplifier and preamplifier, the "Convertible"—General Apparatus Company's "Van Amp" electronic crossover network—Observations on loudspeaker systems.

PROVIDING IN ONE instrument the advantages of a single-unit amplifier in which the preamp and the power amplifier are combined *and* the advantages of a preamp which may be mounted in one place and a main amplifier which may be located in another, the General Electric Model XA1-320 deserves considerable attention. And while this "Convertible" may not have wheels in the accepted sense, it rolls through its paces on the test bench with flying colors.

Considering first the mechanical features, the amplifier is normally housed in a metal case 15 in. wide, 13½ in. deep over the knobs, and 5¾ in. high, and is designed for horizontal mounting when used in the case—in fact, the instructions specifically state that the unit must be used in a horizontal position. When it is desired to mount the amplifier in an equipment cabinet, it may be removed from the case and placed on a sturdy shelf with the knob shafts projecting through the panel, transferring the escutcheon plate to the cabinet. Because of the heat of the output tubes and the rectifier, the amplifier must be

mounted horizontally when used in this fashion.

However, by separating the preamp and the power amplifier, the former may be mounted with the panel up, if desired—a position favored when the installation is made in an end table, for instance. The power amplifier may then be mounted at a short distance from the preamp, using an accessory connecting cable between the two units. This observer has long wondered why both sides of the escutcheon panel could not be finished with two separate patterns—one for the customary horizontal mounting of the unit, and another for mounting with the long dimension vertical, so as to be read from one of the short ends rather than from the long side. However, it is of some advantage to be able to mount the preamp with the panel in a horizontal plane, and users can arrange the mounting so that the escutcheon labeling is not inconvenient.

As seen in Fig. 2, the amplifier is fitted with five major controls—the one at the left being the rumble filter, while that at the right is the power switch. From left to right the controls are: selector switch, level control, loudness control, bass tone control, and treble tone control. Below the spaces to the right and left of the loudness control will be seen two small holes—these are screwdriver-actuated level-set controls for the RADIO and AUX I inputs.

The selector switch has eight positions: the first five are phono, with equalizations for EUR 78, LONDON LP, old AES, RIAA (marked "STD" and framed in a white sector), RADIO, AUX I, and AUX II. As seen in Fig. 3, LEVEL control is a "flat" volume control ahead of the tone-control amplifier tube; the LOUDNESS control follows the entire preamp; BASS and TREBLE tone controls employ the preferred Baxandall arrangement, using a "hullplate" with all of the compensating capacitors and resistors in a single unit. A similar hullplate is used with the loudness control. The rumble filter functions only with the phonograph input, and cuts response drastically below about 40 cps so as to remove any trace of rumble from faulty record players.

The preamplifier section consists of a single 68C7 with frequency-selective feedback around the second stage to provide the low-frequency boost required for the various curves, and a variable series resistor followed by a shunt capacitor for the rolloffs. The tone-control amplifier employs feedback around the first stage, with the control elements connected between the output of the second stage and the plate circuit of the first. A tape output jack connects to the output of the first stage of the tone-control section, and the recorder is thus fed from ahead of the tone controls, although its signal output is con-

trolled by the LEVEL control. However, in normal operation it is likely that the user would employ the LOUDNESS control to adjust listening level, leaving the LEVEL control fixed. Performance of the preamp section is shown in the two upper sections of Fig. 1. Careful check of the phono curves with the standard values will show that they are quite accurate in comparison with many such units, and the effect of the rumble filter—shown as it would appear with the RIAA curve—is sufficiently sharp as to be very effective, yet without much audible effect upon any but the best loud-speaker systems.

Tone controls are smooth in operation, and designed with a relatively wide flat portion in the center so it is not necessary to be exact in centering the controls when "flat" response is desired. The effect of the loudness control is shown at 20 and 30 db down from maximum, with close approximation to the Fletcher-Munson curves. Subjectively, the control "sounds" satisfactory.

Power Amplifier Section

The power amplifier, Fig. 4, is essentially a Williamson type in the first three stages, but uses the 6L6GB output tubes as pentodes, with 400 volts on the plates and 290 on the screens. The d.c. feed to the preamp section is especially well filtered, with one resistance-capacitance network ahead of the 220-volt feed to the tone-control amplifier, and a second RC network for the 145-volt feed to the phono preamp stages. Outputs of 4, 8, and 16 ohms are provided, being accessible on a terminal strip on the bottom of the amplifier unit. Two a.c. receptacles are located on the power amplifier chassis, one being controlled by the power switch, the other remaining on all the time. Only the amplifier itself is fused—a desirable practice, since the fuse may thus be chosen closer to the amplifier's requirements than if it had to accommodate any unsuspected additional equipment that might be plugged into the accessory receptacles.

Performance of the output amplifier is better than the specifications, since it is

rated at 2.4 per cent IM distortion at 20 watts, while our measurements show it to be 2 per cent at 22 watts—the 2-per-cent point being that at which AUDIO rates amplifiers.

Signal Voltages

With LEVEL and LOUDNESS controls at maximum and both tone controls in the flat position, a signal of .048 volts is required at the RADIO and AUX jacks for the usual 1-watt output, which is considered by AUDIO as the normal average level likely to be used by the listener for the average living room. At the LO MAG input, a signal of 2.6 mv is required for the same output, and at HI MAG the required signal is 6.5 mv. Under average playing conditions, levels from both radio and phono are likely to be considerably higher than these minimums, so hum-and-noise measurements are made with phono inputs of 30 mv and with radio inputs of 0.5 volts, and with loudness control set for a 1-watt output. On phono, the measured hum and noise was 57 db below rated output, on radio, 68 db. While these figures are not especially low—being 32 and 43 db, respectively, below 1 volt, they are at least realistic and, in our opinion, all hum-and-noise figures should be stated in "db below 1 volt" or below some other standard, rather than "db below rated output," since this gives a statistical advantage to the higher powered amplifiers; inasmuch as the user is not likely to run his system at any higher level with a 50-watt amplifier than he is with a 10-watt unit—in the same room, of course—the higher figure for the 50-watt amplifier may appear to be in its favor. However, this amplifier does not have noticeable hum or noise in its output, so most of the foregoing discussion is largely academic.

On the whole, this amplifier performs quite satisfactorily, provides sufficient flexibility for almost any record equalization requirements, provided the user is willing to employ the tone controls to accommodate any unusual characteristics, and has sufficient power output to ensure comfortable listening levels. V-24

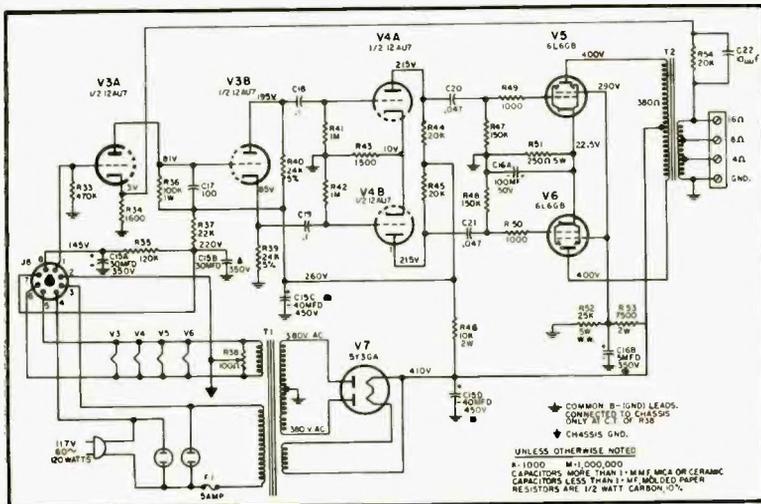


Fig. 4. Schematic of the power amplifier section.