

# Equipment Report

## Brociner Mark 10 Integrated Audio Amplifier— Fen-Tone Anti-Static Pickup, Model 350A+

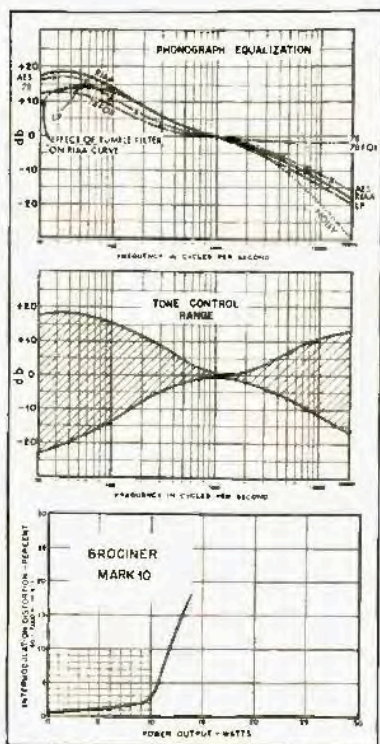


Fig. 1. Performance curves for the Brociner Mark 10 amplifier.

**I**N A FIELD which includes dozens of medium-powered amplifiers, there is always room for one more, particularly when its specifications and performance come up to the standards exhibited by the Brociner Mark 10. Physically it is 4 3/4 in. high, 10 1/2 in. long, and 8 in. deep, and is thus small enough for the most modest installation. The front panel is 3 x 10 9/16 in. and mounts with only the control shafts passing through the cabinet, if desired, or it may be used in the open in its attractive maroon-and-gold-finished case which is perforated for ventilation.

The amplifier employs a printed circuit chassis on which all tubes are mounted, together with most of the resistors and capacitors—all, in fact, except those directly associated with the equalization and tone controls. Low-noise resistors are used in the preamplifier section, and coupling and bypass capacitors are tropicalized. The power supply section employs a choke for greater filtering, and the heaters of all tubes are binned 22 volts positive to reduce hum from that source to a mini-

mum. On the whole, the amplifier is designed along good engineering principles and does not rely on "gimmicks" for its performance.

Performance curves are shown in Fig. 1, with the six phonograph equalization positions in the upper portion, tone control range in the center, and intermodulation distortion in the lower. The effect of the rumble filter on the RIAA curve is shown, although the same reduction of extreme low-frequency response can be had with any of the phono settings. The tape-reorder feed jack is connected electrically just following the tone-control section, and while the tone controls do affect frequency response, the volume control does not. The secondary of the output transformer is so arranged that most of the winding is in use regardless of load impedance, a practice which improves coupling with a resulting increase in stability.

For a 1-watt output, an input of 0.55 volts is required on the RADIO, TAPE PLAY, and TV jacks; the same output is obtained in the phono positions from an input of

### PARTS LIST FOR THE MARK 10 AMPLIFIER

R1	27 K	R24, R38	100 K	C3, C5, C17	.02
R2, R3, R6	4.7 meg	R26	560	C6, C8	.03
R4, R5, R9	62 K	R27	3300	C7, C21	.01
R7, R14, R21	1.0 meg	R28	820	C9, C10	.330 $\mu$ uf
R8, R30, R31	220 K	R29, R34, R35	270 K	C11	1000 $\mu$ uf
R10	10 K	R33, R37	1000	C12	.0039
R11, R12, R13	100 K	R35	300, 5w	C14, C24, C25	0.1
R15, R22, R25	47 K	P1, P2	1.0 meg	C15, C22	.05
R16	6800	P3	500 K	C16, C18	.0025
R17, R20	1600	P4	500	C23	.390 $\mu$ uf
R18, R19	100 K	C1, C19, C20	220 $\mu$ uf	C26	20-20/450, 50/50
R23, R32	22 K	C2, C4, C13	.05	C27	10-20-20/450

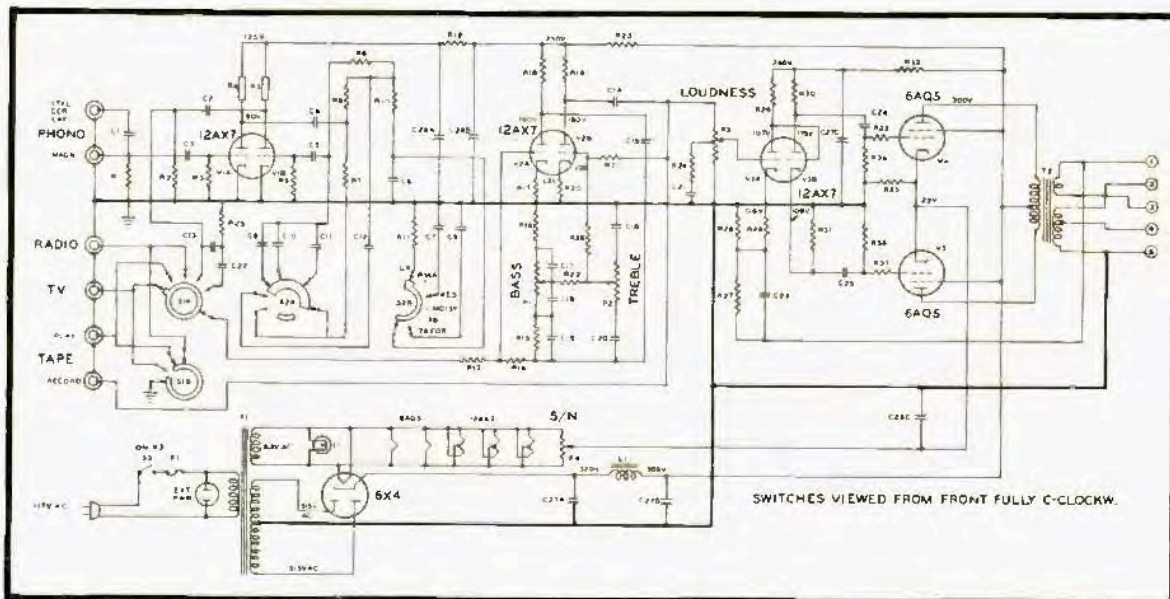


Fig. 2. Schematic of the Mark 10. Parts values are tabulated above.

2.7 mv, which indicates adequate gain for any pickup commonly available. Hum and noise was measured at 70 db below 1 watt with volume control in the maximum position on radio and the auxiliary inputs, and at 55 db below 1 watt on the RIAA phono position. These values will differ slightly from those stated by the manufacturer, since it is common practice to state hum and noise related to the maximum output of the amplifier, whereas Audio is of the opinion that hum and noise should be related to a fixed output signal. If it is not, a low-powered amplifier suffers by 6 to 10 db in comparison with specifications. What is wanted, actually, is an *absolute* measure of hum and noise output, for the average user will reproduce music at about the same level in the home whether he has a 10-watt amplifier or a 50-watt one. A fairer measure would be to measure the hum and noise at a setting of the volume control which would give a 1-watt output with a signal of 0.1 volts on the high-level inputs and of 10 mv in the phono position. The Mark 10 measures 6.4 db by this method, which is excellent.

The volume control is partially compensated for loudness, but only to a small degree so that if more bass boost is required for low-level reproduction, the user can add it by the tone control. This compromise would appeal to those who do not favor loudness controls. **F-17**

### FEN-TONE ANTI-STATIC PICKUP MODEL 350 A+

As little as five years ago, it was possible to make measurements on pickups and come up with startling results—there were few really good ones then, and those that were good were outstanding when compared to the average. Now we have a wide variety of good pickups on the market which, like loudspeakers, are uniformly good yet may sound slightly different. In other words, if we choose any of the recognized cartridges we are almost certain to get a good one, and it only devolves upon the user to choose the one which sounds best to his ears.

But therein hinges the story on the unit described in this report—to date the Fen-Tone cartridges are less well known than some of the models that have been on the U.S. market long enough to become established. Yet this should not keep the interested observer from hearing everything that is available, else he might miss some very good products.

The Fen-Tone magnetic pickup is manufactured in Denmark by the internation-

ally celebrated Bang and Olufsen, whose microphones and professional equipment have achieved an enviable status throughout the world. Shown in Fig. 3, the model 350 A+ consists of a plastic housing which is so mounted that it tilts laterally to present the proper stylus to the record groove. Electrical contact is made through the mounting, eliminating possible breakage of connecting leads due to continual changing from LP to standard stylus. The stylus assembly consists of a protective sleeve attached to a spring clip. The armature moves within the protective sleeve, and is actuated by a stylus shoe which—on the dual-stylus models—carries two styli positioned side by side. Extrusions on the spring clip prevent damage to the stylus shoe in case the pickup is dropped into the record.

Figure 4 is a diagram of the mechanical construction to show the eight poles of the pickup coil and the armature which is constructed with a 90 deg. twist to mate with the pole pieces. Because of the coil and armature construction, hum pick-up is reduced, and the Fen-Tone shows excellent characteristics in this regard.

Stylus changing is effected by simply lifting off the spring clip with the tip of a knife blade, or with the fingernails if available.

Most recent innovation of the Fen-Tone cartridge is the use of a small piece of foil laminate which gives off alpha rays. This foil irradiates the space around the styli and extends its effect to the record surface while it is playing so as to ionize the air and dissipate the static charge on the record. This can be shown dramatically by noting the presence of a static charge on a record by holding it over a pinch of cigarette ashes. Then, after brushing and wiping the ashes off the record as well as possible, play the record once with the A+ cartridge and repeat the test. This time the ashes will not be picked up by the record. Continual use of an anti-static pickup—and it is certainly an advantage to have the anti-static feature a part of the pickup rather than to be attached as an accessory—should reduce the dust-attracting propensities of vinylite records with a resulting longer life of both records and styli.

Six types of Fen-Tone cartridges are available: the Reversible Silver Label, with two sapphire styli; the Reversible Gold Label with a diamond LP stylus and a sapphire 78 stylus; two Single Silver Label models with either LP or 78 stylus in sapphire; and two Single Gold Label models with choice of styli in diamond. Basically

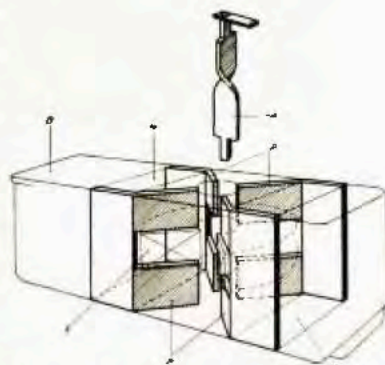


Fig. 4. Diagram of physical construction of the Fen-Tone cartridges.

the characteristics are identical—with only a slight variation in equivalent mass of the stylus tip. Dual models have an equivalent mass of 4.5 milligrams; the single-stylus models have an equivalent mass of 3.5 mg. According to manufacturer's specifications, the compliance is  $5 \times 10^{-9}$  cm/dyne, and tracking force is 3 to 7 grams for the microgroove stylus models and 9 to 12 grams for 78's. Measured output voltage (using the Cook test record) for a 9-in/sec stylus velocity is 61 millivolts, which is relatively high. It is, in fact, the highest output signal measured of a number of commercially available magnetic pickups. This is an advantage with many amplifiers which may be on the verge of not having enough gain, and the high output voltage permits using a lower setting of the volume control with consequent reduction of hum due to the preamplifier.

Measured response is smooth throughout the usable frequency range, and flat  $\pm 2$  db from 16 to 15,000 cps, above which there is a slight rise. D.c. resistance of the cartridge is 350 ohms, impedance at 1000 cps is 530 ohms, and the inductance calculates at 63 mh; measured inductance is 83 mh.

**F-18**

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Fig. 3. Fen-Tone 350 A+ Anti-Static magnetic pickup.