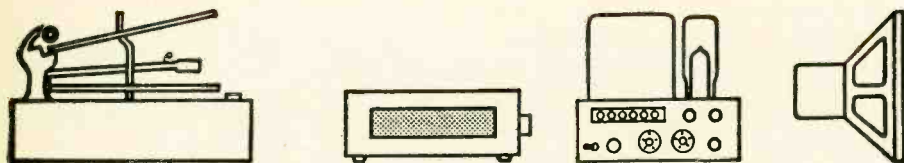


EQUIPMENT



PROFILE

H. H. SCOTT MODEL 260 SOLID-STATE AMPLIFIER

With the appearance of more and more transistorized amplifiers, it seems likely that descriptive literature may soon resort to the terminology employed in the automotive industry, for "cool" and "compact" are certain to be used. For whatever else transistors have offered in the amplifier category—and that is plenty—they can be compact, and they certainly run cool.

The new Scott 260 is also compact. Matching other Scott components in general appearance and size (most require the same panel cutout—4 $\frac{1}{2}$ x 14 $\frac{1}{2}$ in.) it offers a full-size 80 watts (music power) as a fitting companion to the already well-accepted line of Scott tuners—and particularly the 312—and still runs cool enough as not to require any excessive precautions about ventilation. As a matter of fact, it dissipates only 25 watts of heat at standby, and radiates less heat than a 100-watt lamp under full power.

In appearance, the 260 could be a conventional tube amplifier except for its size. The panel is 4 $\frac{1}{2}$ x 15 in. and it requires a depth of 13 in. from the front of the mounting panel. A dividing line separates four switches and a volume-control knob at the top from the less-used controls such as input, selector, bass, treble, balance, and the speaker and power switches in the lower half.

The upper switches are TAPE, RUMBLE, SCRATCH, and VOLUME/LOUDNESS. The INPUT switch has four positions—TAPE HEAD, PHONO, TUNER, and EXTRA, the latter being a welcome change from

the usual "AUX." The selector switch ofers seven positions—BAL L, BAL R, MONO, STEREO, REVERSE STEREO, L INPUT, and R INPUT.

The "BAL" positions are a Scott feature which combines signals from both channels and feeds them only to either L or R speakers, permitting an accurate balance adjustment between them. The L and R inputs select the input from either channel and feeds it monophonically to both speakers. The other positions are self-explanatory.

Next in line across the bottom are the dual-concentric bass and treble tone controls providing separate control of the channels yet permitting easy control over both channels at once when desired. The last knob on the bottom section is the balance control. The remainder of the section is occupied with the speaker and power switches, a pilot lamp, and a stereo headphone jack—an especially desirable feature in these days of headphone popularity.

The rear panel mounts a power fuse and two speaker fuses, two convenience receptacles—one switched and the other not—a derived center-channel phono jack, tape recorder feed and output jacks, four pairs of inputs for TAPE HEAD, PHONO, TUNER, and "EXTRA." Also included are a grounding terminal, a slide switch for each channel to adjust for speaker impedance—either 8 and 16 ohms or 4 ohms, and a three-position slide switch to adjust phono input sensitivity. These last three switches are especially desirable, since the user may have two speakers with different impedances—or perhaps he wishes to parallel another speaker to feed a different

location, and thus requires a different output impedance—and not all phono cartridges are of the same output level, though many amplifiers make no provision for this condition. In the 260, the SENSITIVITY switch has three positions which adjust the amplifier (by a change in the preamp feedback circuit) to give rated output at 3-, 5-, or 9-mv inputs, respectively. In the least-sensitive position of the switch, preamp overload is satisfactorily high at 63 mv, while there is still adequate gain in the most-sensitive position for the lowest-level cartridges. The 9 mv position will be fine for most cartridges. This phono overload point has become the first parameter we measure, since we have encountered some units which have been disappointing in this figure. It is our opinion that the preamp overload signal should be at least 40 mv, since with average cartridges and records, this value is reached more than occasionally. This measurement is made at 1000 cps, and the overload point diminishes rapidly as frequency is lowered.

Circuit Description

The two channels of the 260 are, of course, identical, and each employs 11 transistors, mostly silicones. The preamp section uses three—two 2N2926's and one 2N2613 or 2N508A. Equalization is provided in the feedback circuit, as is also the sensitivity change previously described. This is followed by one section of the input switch and the tone-control amplifier, which uses two more 2N2926's. The tone control circuit is similar to the Baxandall in that the frequency discrimination is provided by feedback. The scratch and rumble filters are also incorporated in this section. The driver section comes next, and employs three selected 2N3053's and one 2N398B, the latter a PNP unit used as a phase reverser. This section feeds the single-ended push-pull output stage using a matched pair of 2N3055's or 2N3235's mounted on a large heat sink. Bias and balance adjustments for the output section are provided in the driver amplifier. No transformers are employed in the audio circuits, and though this somewhat complicates the design, it does result in a fine amplifier with a minimum of phase shift throughout. The accommodation for differing speaker impedances is a switchable network in the feedback circuit from output to the base of the first transistor in the driver section. Coupling to the speaker from the common point of the output pair is by means of a 2000- μ f capacitor to give good low-frequency response. The derived center channel has an impedance of 4700 ohms, the value of a resistor to ground from this point, which is fed by an 82,000-ohm

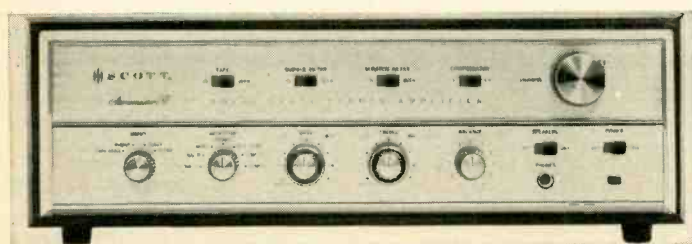


Fig. 1. H. H. Scott Model 260 solid-state amplifier.

resistor from the two speaker lines. The speaker terminals are fused to prevent any damage to the output stages in case of a short in the leads—an open circuit makes no difference, apparently, since the speaker switch simply opens the circuit without substituting a dummy load. The headphone jack is fed through a 220-ohm resistor from each speaker lead.

The power supply uses two silicon rectifiers, 2250 μ f of capacitive filtering, and one 27-volt Zener diode to stabilize the low-level stages.

Performance

As we have learned to expect with Scott equipment, the 260 lives up to its specifications—even exceeding them in places. We measured 0.8 per cent total harmonic distortion at 45 watts (sine-wave) output, while the specifications claim only 30 watts. With both channels operating simultaneously, we measured 40 watts per channel at 0.8 per cent THD. At the more usual output level of around one watt—adequate with efficient speakers—we measured a THD of only 0.15 per cent, which is certainly exceptionally good. IM was less than 1 per cent at rated power (60 and 7000 cps, 4:1).

A signal of approximately 0.5 volts is available to feed a tape recorder, and rated output from the amplifier is achieved with only 2 mv input from a tape head. 3, 5, and 9 mv, respectively, will provide rated output from the phono input at three settings of the sensitivity switch, while the high level inputs require approximately 0.5 volts for the same output. The scratch filter is down about 7 db at 10,000 cps, commencing to roll off at 3500 cps. The rumble filter is down 11 db at 50 cps, with the effect commencing at about 125 cps. Loudness compensation measured 8.7 db at 50 cps, and the tone controls provide a boost and cut of 10.5 db at 10,000 cps, and 13.3 db boost and cut at 30 cps.

These symmetrical figures betoken considerable care in the selection of values in the tone-control circuits, and the over-all design appears to be conservatively done—both electrically and mechanically.

Listening and Operation

Until someone finds out how to derive adequate aesthetic pleasure from meters or an oscilloscope, the ultimate proof of a hi-fi component is in the listening. Second to this is how it handles. If an amplifier sounds good but is poorly arranged or the switches are difficult to operate or the volume and tone controls have the wrong taper, the user is likely to become disenchanted after a few hours of even delightful listening.

The 260 has “nice manners” in operation and we certainly could find no fault whatever in its handling. We were pleased at the solid bass, resulting largely from the high damping factor that seems to be the reason for the so-called “transistor sound,” which might be described as a “tightness” or “dryness.” This type of sound results from a complete elimination of loudspeaker hangover. High-frequencies from such instruments as violins and oboes have a silky smoothness which is pure joy to hear in any reproduction.

Now may be the time for all good audiofans to convert to solid-state amplifiers—and if you are thinking of buying any amplifier, the 260 is bound to be a most satisfactory choice. **Circle 208.**

BOGEN B-62 TURNTABLE

The Bogen B-62 is not a new turntable; rather it is a significant updating of a well established system. Its direct ancestor was the B-61, a unit that established a good reputation for itself at a very modest price.

The differences between the B-61 and B-62 are not obviously visible: The arm has been redesigned so that it can accommodate a wider range of cartridge weights at the lowest stylus forces; the stylus force adjustment has been altered; the cartridge shell is metal instead of plastic. Otherwise, this is much the same unit as before.

The B-62 is an integrated unit. That is, the arm and turntable are irrevocably married to each other. The arm is of a static balance type, stylus force comes from unbalancing the arm for the required downward force. The on-off switch is linked to an arm lift device that is completely disconnected when the arm is in play position.

The turntable is really unique. It consists of a 7 $\frac{1}{2}$ -lb. non-ferrous platter that is driven by a four-pole motor. The motor is linked to the platter by a puck drive on the underside of the platter (not its rim). Accordingly the underside of the platter is accurately machined and polished. Of major interest is the shaft from the motor that drives the puck. Instead of the usual step diameters for the various speeds, this shaft is a tapered shaft with three steps,

each step tapered (there are actually four speeds—33 and 45 are on one step). The result is *continuously* variable speeds. Steps are provided for practical purposes, the shaft would have to be too long without them. Continuous speed change is provided from just below 33 to a bit over 80 rpm.

The value of this speed control is obvious to the music lover. Particularly, if he plays along or has a collection of older non-standard speed discs. Precise pitch control is his. At the same time, Bogen recognizes that fishing for an exact speed is not everyone's cup of tea, so they provide four click-in stops for the four popular speeds.

The Tests

As received, the Bogen B-62 was right on speed at 120 volts: at 130 v it became 1.5 per cent fast; at 100 volts it was only 0.5 per cent slow; at 85 volts it became 2.0 per cent slow. These are very satisfactory speed regulation-versus-voltage figures indeed. And remember that the table can be adjusted to *exact* accuracy regardless of voltage.

Flutter measured 0.09 per cent while wow was 0.40 per cent.

Rumble measured 25 db based on 3.54 cm/sec recorded velocity at 1 kc. However, oscilloscope checks showed that the rumble was all well below 20 cps (centered around 15 cps).

Arm tracking error was moderately low. With an Empire 880P cartridge, we measured 1 degree per inch as the arm moved inward. Maximum error at a 6 in. diameter was just under 3 degrees. Arm resonance was very low in frequency (10 cps) and was +5 db. This places it well below the range of recorded music and should cause no performance problems at all.

Listening tests were made to find how far the ear could confirm these measurements. Rumble is inaudible, mono or stereo. Piano tones were pure without audible flutter or wow. The arm tracked well at the lowest recommended forces.

This table sells for a mere \$64.95. It is solidly built, and appears extremely reliable. And, it performs quite well indeed. **Circle 209 on Reader Service Card**

(Continued on page 44)



Fig. 2. Bogen B-62 Turntable

EQUIPMENT PROFILE

(from page 34)

EICO SOLID STATE FM-STEREO RECEIVER, MODEL 3566

The EICO Model 3566 is completely solid state FM-stereo receiver, designed as a kit but available factory assembled, which has successfully tackled many of the problems which had plagued early solid-state designs. Thus we find that the 3566 *decreases* in distortion as power decreases; at normal listening levels distortion is as low as any unit we have encountered, and far lower than most. Also the ability

to handle a wide dynamic range in low-level stages is surprisingly good. For example the phono input, with a sensitivity of 4 mv, does not start clipping until the signal becomes 78 mv. With a sensitivity of 12 mv clipping doesn't start until 240 mv. (The 3566 can be set for either sensitivity by removing or replacing a jumper.)

Some of the conveniences provided by the EICO 3566 are: Automatic,

silent switching between FM stereo and mono; automatic indication of stereo transmission by means of a light; adjustable and defeatable muting; defeatable afc; loudness compensation; tape monitor; and a front panel headphone jack. In addition, the tuning dial is extremely well laid out and lit.

Circuit Description

Tuner: The FM front end and i.f. section are separate assemblies which are apparently supplied as a unit and the transistors are not identified. However, from the schematic we note three transistors in the front end, the r.f. input stage being in the common base configuration. The converter is straightforward. Following the front end assembly is the i.f. assembly which consists of four stages and the ratio detector, with taps for afc, tuning indicator and muting. The multiplex assembly contains ten transistors, all of them 2N2672's except for a single 2N1304 in the indicator circuit. The multiplex is classified as a time division type.

Amplifier: The power amplifier is a good example of the RCA output circuit which has become the most common circuit available. The output transistors are 2147's, two per channel, driven by a transformer, which in turn is driven by a 2N2613. The driver transformer is driven by the emitter of the transistor (low impedance) so that the transformation ratio can be 1:1 and permit a much wider bandwidth transformer. Tone controls are Baxandall type, utilizing a feedback network for boost or cut. The phono input stage is quite straightforward, incorporating a DTG110 transistor for the input stage and a 2N2613 for the second stage, with a feedback network from the output of the second to the emitter of the first, the network incorporating the required equalization. High level inputs such as tape, or auxiliary, or the integral tuner bypass the phono preamp. There is no tape equalization provided, so that the tape input must be from a recorder with a built-in preamp.

Power Supply: The power supply of the 3566 provides electronically regulated voltage to the entire set except for the amplifier power output stage, which really doesn't require regulation. Transistors (three) are used to regulate the various supply sections, apparently quite successfully to judge by performance.

The Kit

The kit version of the 3566 is designed to require absolutely no adjust-



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ment. This is achieved by having the front end, i.f., and multiplex sections factory assembled and adjusted, each on its own circuit board. The amplifier section, and preamplifier are also uncomplicated, in spite of the switching. The transistors are safeguarded, and assembly eased, by the use of sockets for the transistors instead of having to solder to them directly.

The manual is quite clear and detailed, with a good deal of space given to oversized illustrations. We were particularly happy to note that the operation and service sections were completely removed from the assembly section; two separate manuals are provided. In fact, the operation manual is precisely the same as provided for factory assembled units. And rightly so.

Performance

Amplifier: The amplifier provided 25 watts per channel rms with an 8-ohm load and both channels driven; with a 4-ohm load it put out 29 watts rms, with only one channel driven; at 16 ohms it provided 27 watts rms, both channels driven. Distortion measured 0.4 per cent at 25 watts rms, 8 ohms, from 20-12,000 cps; at 12.5 watts it measured 0.33 per cent; at 1 watt 0.13

Fig. 3. EICO solid - state FM - stereo receiver



per cent, 20-18,000 cps. Intermodulation was 1 per cent at 25 watts (60-7000, 4:1), 0.25 per cent at 1 watt. Frequency response was within 1 db from 10 to 63,000 cps. Hum and noise measured 69 db below 10 mv on phono. At the most sensitive position of the phono jumper, sensitivity was 4 mv. At other inputs sensitivity was 190 mv.

With an 8-ohm speaker connected to the speaker terminals, we swept from 20-20,000 cps and observed the waveform on an oscilloscope in order to determine whether the amplifier reacted well with a reactive load such as it would normally encounter. Results were quite excellent. We did not attempt a capacitive load, but experience with this type of circuit leads us to believe there would not be any difficulty.

Tuner: Sensitivity, IHF, is 2.2 μ V; channel separation was 39 db; capture ratio was 4.5 db; harmonic distortion 0.45 per cent; audio response within 1 db from 20-15,000 cps; AM rejection 43 db; crossmodulation index, 61 db.

Listening tests reveal that the 3566 is a fine performer and an extremely good buy at its kit price of about \$230 (factory assembled at \$350). Its handling of music is most enjoyable, delivering a firm but full bottom end and smooth response throughout the rest of the range. As a tuner, we were quite impressed with its ability to handle a strong signal, an ability which early all solid-state tuners didn't share. We were also impressed with its generally good handling and low noise level. A very satisfactory product at a very attractive price.

Circle 209



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