

# Equipment Profile

## THE SONY COMPONENT LINE

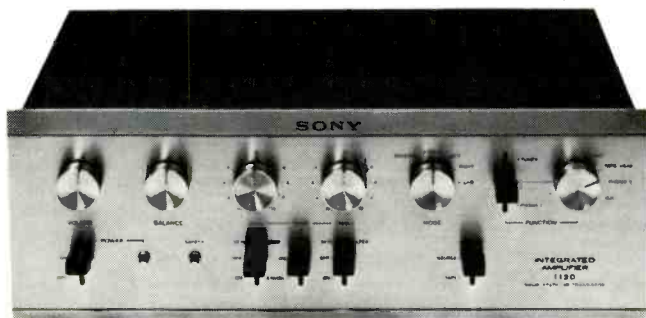


Fig. 1. The SONY SONY TA-1120 integrated amplifier.

### TA-1120 INTEGRATED AMPLIFIER

It has come to be almost axiomatic that when Sony introduces a piece of equipment it is likely to be excellent in performance and equally excellent in appearance—or perhaps we should say elegant. The TA-1120 integrated amplifier certainly fulfills whatever expectations we would have from Sony.

Figure 1 shows the over-all appearance of the unit, with a black ventilated case and its gold-colored panel and knobs. The top and bottom bands on the panel are satin finished, while the center section has a brushed surface. Departing from the usual symmetry in design, the controls are functionally placed, and offer some innovations. From left to right, the knobs are volume, balance, bass tone, treble tone, function, and selector. The lever switch between the last two knobs is a "quick-action selector"—in the upper position the tuner is connected; in the lower position is phono 1; in the center the right knob is operative, with positions for microphone, tape head, phono 2, and aux. Thus for the most common uses, the lever switch does the selecting of source, giving three choices, depending on the setting of the knob for the third one. Along the lower portion of the panel are five more lever switches. At the left is the power switch, and its related red indicator light. Next comes the green safety light, about which more later. Then comes the 50-Hz high-pass filter switch, the tone-control-cancel switch, and the 9000-Hz low-pass filter switch. Finally there is the monitor switch, which permits listening to the source while recording, or to the tape

itself, when used with a transport having three heads and a preamplifier.

The rear panel mounts all inputs and outputs, arranged in two rows—the upper row for the left channel and the lower the right. Two switched a.c. receptacles and one unswitched are provided. In addition there is a ground terminal—all too often missing in high-gain amplifiers. Level adjusting controls for tuner and the aux input are also on the rear, as is a 5-terminal Hirschmann-type receptacle for input and output connections to a tape recorder. Two more pairs of phono jacks provide the user with the output from the preamp section and the input to the power amplifier section, thus permitting a wide variety of circuit variations—additional power amplifiers can be connected at this point, for example, or an electronic crossover may be used, with the TA-1120's amplifier used for one band of frequencies, and a pair of stereo power amplifiers used for the other two. (At the New York Hi-Fi Show Sony exhibited a three-channel electronic crossover which should be available in a few months, and the TA-3120 stereo power amplifier is already available.)

### CIRCUIT DESCRIPTION

The TA-1120 employs 46 transistors and 23 diodes, with all transistors being silicon types. Both channels are the same, of course, and are built up (in the preamp section) mainly with feedback pairs, each of which has nearly 40 dB of feedback around it. There are two preamps, with the one used for phono 1 having a sensitivity of 4 mV, while that for tape

head, microphone, and phono 2 has a sensitivity of 1 mV. Equalization is switched as the rotary selector is rotated. The tape-head equalization is provided with a control, accessible from the bottom of the chassis, which varies high-frequency response over a range of about 10 dB at 10,000 Hz to compensate for the recorder.

The second feedback pair comes next in the circuit, and after it is an emitter-follower stage which feeds the hi- and lo-cut filters. Another feedback pair provides additional gain, while still another furnishes the gain required by the step-type tone controls. When the tone-control-cancel switch is operated, this pair is out of the circuit, as are the tone controls themselves, leaving the amplifier in a flat position—and by flat, we mean within less than half a dB from 40 to 60,000 Hz. Figure 2 shows the effect of the hi- and lo-cut filters.

Following the tone controls is another feedback pair and the balance control, and finally a bridged-T filter which serves as a high-pass filter to cut off at about 30 Hz, thus eliminating the extremely low frequencies which can damage loudspeakers when tuning across the band with an FM tuner or when the phono stylus drops on a record, for example. Also, the filter effectively eliminates rumble from poor turntables. The output of the bridged-T filter is the final point in the preamplifier section, and is fed to a phono jack. A short jumper carries the signal to the input jack for the power amplifier section which employs nine transistors, four of them being the power stage. The first three transistors provide the signal for the quasi-complementary driver stage, which uses a pair of transistors which have a current capacity of 2 A and a cutoff frequency of 9 MHz. The driver stage feeds the output transistors in a parallel single-ended push-pull configuration, with 4-amp transistors having a cutoff frequency of greater than 15 MHz. Thus high-frequency performance is maintained way above the audio spectrum.

From the output stage the signal is fed to the loudspeakers, and to an SCR which "dumps" the supply to the drivers in case of too great a signal or if the speaker leads are momentarily shorted. Because of the use of the SCR, the operation is practically instantaneous, so the output transistors are not likely ever to be damaged. When overload or shorted speaker lines occur, the green "safety" light goes out, and no sound is

arm. Some anti-skating devices provide the correct compensation at one radius, but the required amount varies as the radius is changed. On this arm, however, the amount of compensation is changed as radius changes. The arm is of the balanced type, with a double counterweight which permits accurate balancing, then a separate weight is moved to achieve the required stylus force, which is adjustable from 0 to 3 gms. A cueing lever raises the arm, or lowers it gently under control of a damped piston. Tracking error is held to less than  $\pm 2$  deg. throughout.

#### THE VC-8E MOVING COIL CARTRIDGE

With the relatively high output for moving-coil cartridges of 4 mV, the VC-8E does not require a transformer, but will work into any conventional phono input. The cartridge is fitted with an elliptical diamond stylus, and tracks well at 1½ gms. Compliance is of the order of  $30 \times 10^{-6}$  cm/dyne, and frequency response extends to well over 20,000 Hz.

The entire Sony line of components thus appears to be of a high quality, and the prices are not low, as might be expected. The TA-1120 is just under \$400.00; the TA-3120 is just under \$250.00, and the "phono package" is almost \$300.00 (TTS-3000, \$149.50, the PUA-237 arm—12 in.—is \$85—a 16-in. model is available as the PUA-286, \$99.00, and the VC-8E is \$65.00.)

But these days the prices are not excessive, particularly when one considers the quality of each individual item.

CIRCLE 1

#### PIONEER ER-420 STEREO RECEIVER

In this day and age of transistor technology, you may well wonder why we are presenting a profile of a vacuum-tube operated device. We must confess that when Pioneer presented us with this unit we shared the same thought.

The fact of the matter is, of course, that the tube is by no means an antique. Far from it. Pioneer designers were after a moderate-power, good-performance receiver that could be sold at a low price. Thus came the ER-420, made to sell for \$210 and sporting a modest 15 watts per channel.

Naturally, if you are used to seeing solid-state units, the ER-420 immediately strikes you as large-sized. And when you turn it on and let it cook for a while you are reminded that two pairs of 6BQ5's, even in AB<sub>1</sub> configuration, along with fourteen other 'valves' make a lot of heat.

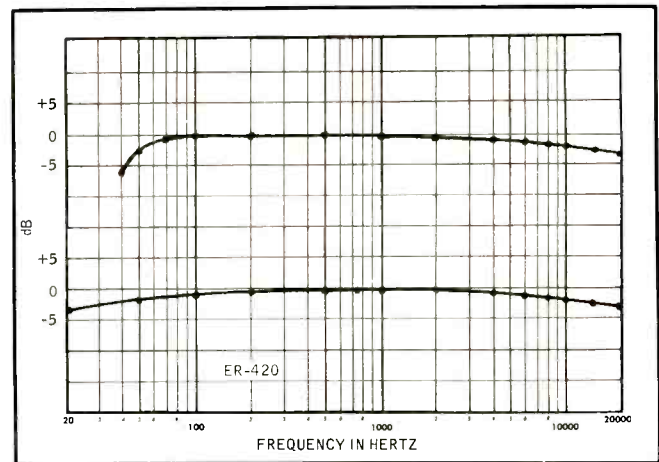
A look at the illustration may serve to indicate (as it does to us) that this is a well-appointed and handsome unit. All of the expected amenities are there. Some special features are a double-duty AFC switch. It is an AFC switch when the tuner section is on FM; but when it is on AM the same rocker switch sets a broad or narrow bandwidth.

Tuning is aided by a signal-strength-type meter. The mode selector has separate positions for FM Mono and FM Stereo. There is no automatic switching although there is a neon indicator that will ignite if it is tickled by 19 kHz.



Fig. 5. The Pioneer ER-420 AM/FM Stereo Receiver.

Fig. 6. Upper curve power response per channel with both channels driven. 0 db = 15 watts. Lower curve—over-all frequency response at 1 watt, tone controls flat.



AUDIO

With the receiver set up and driving a pair of moderate-efficiency speakers of 8-ohm impedance, we were pleasantly surprised by the over-all quality of sound from so modestly priced a unit. Also pleasurable was the feel of the unit; switches are tight but not stiff, and tuning is exceedingly smooth.

#### THE TESTS

Pioneer does not recommend the ER-420 for use with 4-ohm speakers. The output transformers are tapped for 8 or 16 ohms and a rear-panel switch determines which pair is directed toward the screw-type speaker connectors. Most of our tests were made with 8-ohm resistive loads but we also verified 16-ohm performance.

With both channels driven the ER-420 will deliver an honest 15 watts per channel. Power response is attenuated at the bass level to be sure, but it is to be expected that a modest-cost receiver will be used with modest-cost speakers so the lack of 30 Hz capability will go unnoticed. Do notice, however, that the unit will perform admirably as low as 50 Hz. And notice too that the RIAA equalization was within 3 dB of perfect over the entire range.

Sensitivity into the magnetic phono is 3 mV for 15 watts out. Overload will not occur until 0.14 volts. That's something a 12AX7 can do and a transistor cannot. Noise was a satisfactory 61 dB below a 3 mV input.

IM distortion through the high-level inputs was as follows for the specified power:

	Left	Right
1 watt	0.06	0.81
5 watts	0.23	0.60
10 watts	0.77	0.89
12 watts	1.60	1.40
15 watts	2.30	3.20

If these are not spectacular figures neither are they figures that Pioneer need hide in shame. For a unit at this price level (and that, after all is how any component must be judged) the ER-420 has low distortion. Incidentally, the over-all S/N is 70 dB.

The tuner acquitted itself admirably on our test bench. Sensitivity for 30 dB S/N is 4  $\mu$ V, full limiting occurred at 100  $\mu$ V where the S/N reached its best figure of 58 dB. In the stereo mode, midband separation was 31 dB falling to 18 dB at 10 kHz. Frequency response was  $\pm 2$  dB from 30-15,000 Hz in mono or stereo modes.

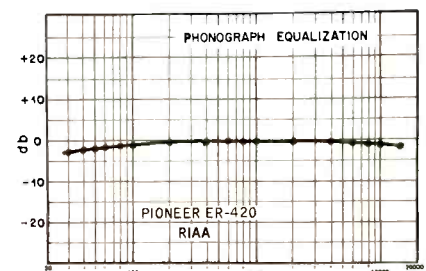


Fig. 7. Accuracy of the magnetic-phono input to the RIAA curve.

We have to stress again that this is a low-cost component. It would be unfair to ask performance of it that compares with \$400-and-higher units. The real question to be asked is: does this unit represent high quality? is it also representative of what we call 'high fidelity'?

We think it is.

CIRCLE 2