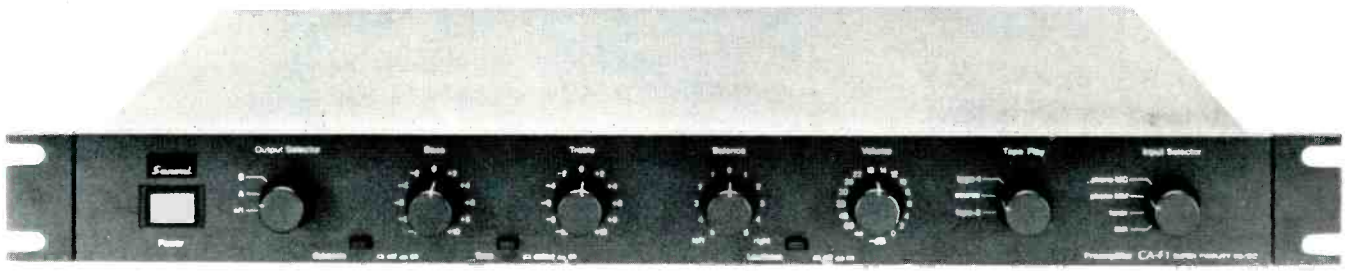
Sansui Model CA-F1 Preamplifier



Manufacturer's Specifications

Frequency Response: Phono, RIAA, 20 Hz to 20 kHz, ±0.2 dB; high level, 5 Hz to 100 kHz, +0, -0.2 dB.

Rated Output: Main, 1 V; tape, 150 mV.

Maximum Output: 10 V.

Maximum Phono Input: MM, 350 mV; MC, 24 mV.

THD: Less than 0.005 percent at or below rated output.

IM Distortion: Less than 0.005 percent at or below rated output.

Input Sensitivity: Phono MM, 2.5 mV*; phono MC, 0.1 mV*; high level, 150 mV* (see text).

S/N: Phono MM, 90 dB**; phono MC, 75 dB**; high level, 100 dB* (see text).

Bass Control Range: +7, -9 dB at 50 Hz.

Treble Control Range: ±7 dB at 15 kHz.

Subsonic Filter: -3 dB at 16 Hz, 6 dB/ octave slope.

Rise Time: 0.6 μS.

Power Consumption: 45 watts.

Dimensions: 16-15/16 in. (42.34 cm) W x 17-3/16 in. (42.97 cm) D x 2-3/8 in. (5.94 cm) H; with rack-mount adaptors, 19 in. (47.50 cm) W.

Weight: 13.4 lbs. (6.09 kg) with rack-mount adaptors.

Price: $495.00.

This slimly configured preamplifier-control unit from Sansui, as its model number might suggest, is intended to serve as a companion component to that company's Model BA-F1 power amplifier, tested for *Audio's* March '80 issue. Both units are rack mountable and have front panels finished in matte black. Unlike the rather hefty looking BA-F1, however, the CA-F1 preamp is an extremely slim unit, requiring just a little over two inches of vertical panel space. What the unit lacks in height, it makes up in depth — requiring an extremely deep shelf on which to place it if you don't go the rack-mount route.

All of the CA-F1's major controls, as well as its push button on/off switch, are arranged in a single row across the face of the unit. The on/off switch becomes internally illuminated when power is applied. Rotary controls from left to right include the *Output Selector* (there are two separate pairs of output jacks at the rear of this unit, either of which may be selected by means of this switch), click-stepped *Bass* and *Treble* controls calibrated in approximately 2-dB increments, a *Balance* control, master volume control, tape mode switch, and an input program selector switch. The *Input Selector* has settings for moving-coil cartridge as well as moving-magnet inputs, in addition to the usual AUX and tuner settings. This preamplifier also has a built-in pre-preamp with a flat-response gain of approximately 28 dB. Three tiny push buttons positioned along the very lower edge of the front panel are

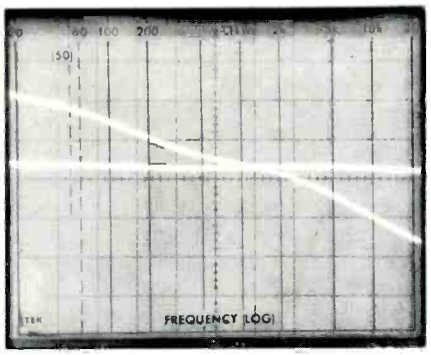


Fig. 1 — Sloped curve is the RIAA response. Flat response is obtained when applying the inverse RIAA signal.

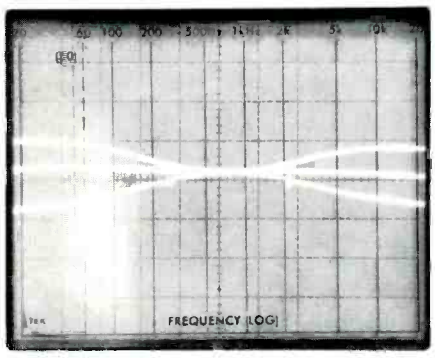


Fig. 2 — Bass and treble control range.

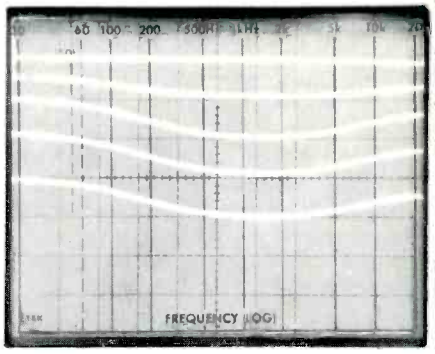


Fig. 3 — Loudness compensation measured at volume settings 10 dB apart.

used to activate a subsonic filter, defeat or bypass the tone control circuitry, and introduce loudness compensation.

The rear panel of the CA-F1 features two pairs of gold-plated phono input jacks for low-resistance contact between phono audio plugs and first-stage equalizer-preamp circuitry. A chassis ground terminal is located adjacent to these phono inputs. The remaining AUX, tuner, and tape inputs as well as two sets of tape outputs for the two available tape monitor circuits are to the right of the phono inputs, wh le further to the right are the twin output jack pairs mentioned previously. At the extreme right of the rear panel is a single *unswitched* a.c. outlet, obviously intended for connection of one's turntable system rather than for connection of an associated power amplifier. The receptacle can only safely supply 450 watts.

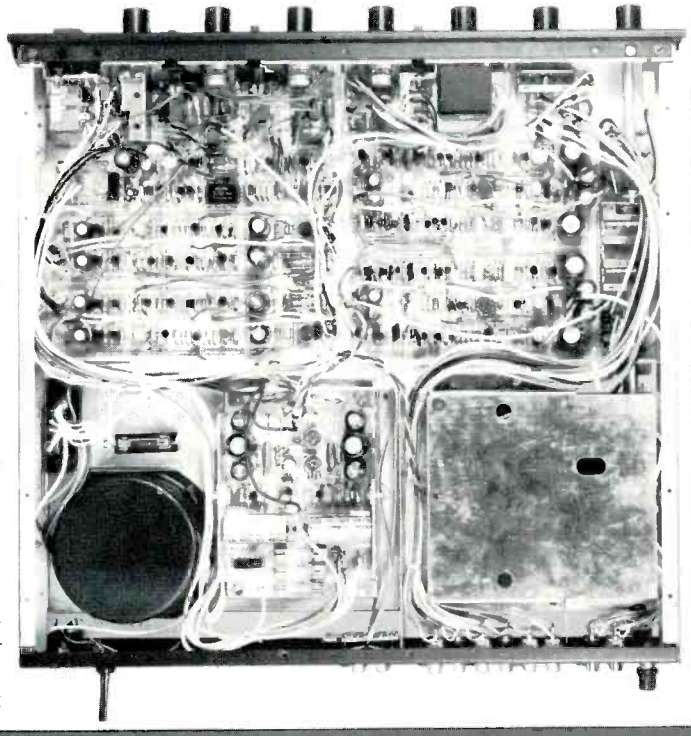
Circuit Highlights

Like the companion BA-F1 amplifier, the CA-F1 makes use of what Sansui calls a "Diamond Differential DC" circuit, this time in the phono-equalizer amplifier. The input stage consists of a pair of low-noise, high-transconductance FETs operating as a differential amplifier, followed by a cascode bootstrapping circuit. The intermediate stages which follow couple the aforementioned DD/DC circuit with a current differential push-pull driver. This DD/DC circuit is basically a dual complementary differential circuit with push-pull output formed by two pairs of NPN and PNP transistors. Input is voltage amplified by separate pairs of transistors. These symmetrical differential amplifiers feature an excelle nt common-mode rejection ratio. The other two pairs of transistors (which, combined with the first two pairs and drawn schematically, account for the "diamond" description) work as current differential amplifiers to achieve high drive current, as required. The final output of the equalizer-amp section is a Darlington-connected single-ended push-pull design that provides the desired low output impedance. The phono equalizer-amp circuit alone employs 20 semiconductors.

The so-called "flat amp" section of the CA-F1 also uses a low-noise dual-FET input stage followed by a cascode stage and a current-differential circuit. Signals pass or to a differential push-pull circuit featuring a current mirror stage for which Sansui has a patent pending, and from there to a two-stage Darlington-connected single-ended push-pull output stage. Boost and cut of the bass and treble controls are accomplished by varying the applied negative feedback.

Lab Measurements

Before discussing our measured results, it should be pointed out that Sansui, in its published specifications, has not as yet converted to the new IHF Measurements Standards (IHF-A-202, 1978) for Amp ifiers. Thus, their specifications followed by (*) in our tabulation were measured with respect to *rated* output, with volume control at maximum. Those specifications noted with (**) were measured with respect to rated input sensitivities *and* rated output. Our own sensitivity measurements are taken for an output of 0.5 V and, not unexpectedly, turn out to be just half of what Sansui speci-



fied (since their rated output is 1.0 V as against referenced IHF output of 0.5 V) — or 77 mV for the high-level input, 1.3 mV for the MM phono, and 0.05 mV for the MC phono. Signal-to-noise ratio is not as easily compared with published specs, however, since it involves both a referenced input (0.5 V for high level, 5 mV for MM phono inputs, and 0.5 mV for MC phono inputs) *and* the referenced 0.5-V output (which involves lowering the master volume control to establish these reference points). Using this technique, we measured an S/N of 84 dB for the MM phono inputs (an excellent result, by the way, compared with typical preamps we have measured in this manner) and 76 dB for the MC inputs (also better than the norm). The high-level S/N ratio was 90 dB, while residual noise and/or hum was 92 dB below 0.5 V out, with the volume control turned down to minimum.

Claims for maximum output of 10 V were precisely substantiated, while in the case of phono overload, the manufacturer's claims were actually somewhat conservative. We measured a 410-mV overload capability (at 1 kHz) for the MM phono inputs and a 25-mV overload level for the MC phono inputs. Frequency response for the high-level inputs was down 1 dB at 140 kHz, while for the phono inputs, RIAA equalization was accurate from 20 Hz to 20 kHz, within 0.2 dB as claimed. Figure 1 is a plot of the RIAA response curve as measured through the phono inputs when applying an input signal of constant amplitude swept from 20 Hz to 20 kHz. The straight-line response represents the results obtained at the output when a careful inverse of the RIAA playback curve is applied as an input signal over the same range of frequencies.

Figure 2 shows the rather moderate range of bass and treble control incorporated into the CA-F1, while in Fig. 3 we have plotted the response curves obtained at various settings of the master volume control when the loudness circuit is activated.

Use and Listening Tests

The Sansui CA-F1 preamplifier/control unit is neither overloaded with useless and superfluous controls, switches, lights and knobs nor is it the sort of "stripped-down" component sometimes favored by extreme purists. Rather, it is somewhere in between, offering those controls and switches that most users would deem essential but without going overboard. Internally, the unit is elegantly designed and assembled. There is far more sophisticated circuitry in this preamp than one would imagine by looking at its external configuration.

During the course of our listening tests using the Sansui BA-F1 as the associated power amplifier, we were impressed with the clean transient response of this combination, the inaudible noise and hum levels (even with volume turned up so as to drive the power amp close to its rated power output), and its well-balanced tonal response. Phono reproduction was, in our view, flawless, whether we used a moving-coil cartridge or one of the better moving-magnet cartridges. Together, the combination of the BA-F1 and CA-F1 would require an investment (at suggested retail levels) of more than $1,000.00 — more than most people pay for their entire component systems, including turntable and speakers. Still, for those who have the discerning taste (and the funds) to enable them to appreciate a pair of components such as these Sansui units, the price will seem more than reasonable.

Leonard Feldman

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