SANSUAU/TU57

Integrated "DC" Stereo Amplifier & Strictly Hi-Fi FM/AM Stereo Tuner.

Only hi-fi, everything hi-fi.

Sansui



SPECIFICATIONS





AU-517 POWER OUTPUT*

> Min. RMS, both channels driven, from 10 to 20,000Hz, with no more than 0.025% total harmonic distortion

> > 65 watts per channel into 8 ohms

LOAD IMPEDANCE* 8 ohms

TOTAL HARMONIC DISTORTION*

less than 0.025% at below rated min RMS power output

INTERMODULATION DISTORTION

(70Hz:7.000Hz=4:1 SMPTE method)

less than 0.01% at or below rated min. RMS power output

DAMPING FACTOR (at 1,000Hz, both channels 60 into 8 ohms driven)

RISE TIME 1.4µSec. 50V/µSec. SLEW RATE FREQUENCY RESPONSE (at 1 watt)

(from POWER AMP IN)

DC to 200,000Hz +0dB.

-3dB OVERALL (from AUX)

5 to 100,000Hz +0dB, -3dB

RIAA CURVE DEVIATION (20 to 20,000Hz)

+0.2dB, -0.2dB INPUT SENSITIVITY AND IMPEDANCE (at 1.000Hz)

PHONO 1, 2 2.5mV, 47k ohms AUX, TUNER, TAPE PLAY

150mV, 47k ohms

MAXIMUM INPUT CAPABILITY (at 1,000Hz 0.01%

THD. 320mV RMS PHONO 1, 2

OUTPUT VOLTAGE AND IMPEDANCE (at 1,000Hz) TAPE REC 150mV/600 ohms into

47k ohm load

PREAMPLIFIER OUTPUT

1V/75 ohms into 47k ohm

MAXIMUM PREAMPLIFIER OUTPUT (0.05% T.H.D.) 10V/75 ohms into 47k ohm load

HUM AND NOISE

PHONO 1, 2 80dB AUX. TUNER, TAPE PLAY

100dB CHANNEL SEPARATION (at 1.000Hz)

PHONO 1.2 60dB AUX, TUNER, TAPE PLAY 65dB

CONTROLS

BASS +10dB, -10dB at 50Hz TREBLE +10dB, -10dB at 15,000Hz SUBSONIC FILTER -3dB at 16Hz (6dB/oct.) LOUDNESS (volume control at -30dB position) +9dB at 50Hz

+7dB at 10.000Hz AC OUTLETS switched max 100 watts unswitched total 250 watts

POWER REQUIREMENTS

POWER VOLTAGE 100, 120, 220, 240V 50/60Hz

POWER CONSUMPTION 345 watts

SEMICONDUCTORS 63 Transistors: 40 Diodes: 10 Zener Diodes: 1 LED:

2 FETs DIMENSIONS 430mm (161%") W

168mm (6%") H 389mm (15%") D

with Rack-mounting Adaptors and Back Stands

482mm (1815/6") W 168mm (6%") H 418mm (16½") D

WEIGHT

16kg (35.3lbs.) Net with Rack-mounting Adaptors and Back Stands 16.5kg (36.4lbs.) Net 18.5kg (40.8lbs.) Packed

TU-517

FM SECTION TUNING RANGE SENSITIVITY

88 to 108MHz

MONO 9.8dBf (IHF T-100 1.7uV) STEREO 19dBf (IHF T-100 4.9µV)

50dB QUIETING SENSITIVITY

MONO 12.5dBf (IHF T-100 2.24µV) STEREO 34dBf (IHF T-100 27.5µV)

SIGNAL TO NOISE RATIO AT 65dBf

MONO 82dB STEREO 78dB FREQUENCY RESPONSE

MONO 30 to 15,000Hz +0.2dB.

-1.0dB

STEREO 30 to 15,000Hz +0.2dB. -1.0dB

TOTAL HARMONIC DISTORTION

MONO WIDE less than 0.06% at 100Hz less than 0.06% at 1,000Hz

> less than 0.08% at 6,000Hz NARROW less than 0.15% at 100Hz

less than 0.12% at 1,000Hz less than 0.18% at 6.000Hz

STEREO WIDE less than 0.1% at 100Hz less than 0.07% at 1.000Hz

> less than 0.1% at 6,000Hz NARROW less than 0.21% at 100Hz less than 0.15% at 1,000Hz

> > less than 0.2% at 6,000Hz

CAPTURE RATIO

WIDE 1.0dB NARROW 1.5dB

ADJACENT CHANNEL SELECTIVITY WIDE 3.5dB (at 200kHz)

8dB (at 200kHz) NARROW ALTERNATE CHANNEL SELECTIVITY WIDE 50dB (at 400kHz)

NARROW 80dB (at 400kHz) SPURIOUS RESPONSE RATIO 90dB (at 98MHz) IMAGE RESPONSE RATIO 85dB (at 98MHz) IF RESPONSE RATIO 100dB (at 98MHz) RF INTERMODULATION 63dB (at 98MHz)

AM SUPPRESSION RATIO 60dB (at 98MHz) STEREO SEPARATION 45dB at 100Hz

48dB at 1,000Hz 38dB at 10,000Hz 36dB from 30 to 15,000Hz

ANTENNA INPUT IMPEDANCE

SENSITIVITY (BAR ANTENNA)

300 ohms balanced 75 ohms unbalanced

OUTPUT VOLTAGE AND IMPEDANCE Variable (FM) 1V. 600 ohms

AM SECTION TUNING RANGE 530 to 1,600kHz

47dB/m (220µV/m) SELECTIVITY (±10kHz) 35dB

IMAGE RESPONSE RATIO 38dB at 1,000kHz IF RESPONSE RATIO 55dB at 1,000kHz GENERAL

POWER REQUIREMENTS

POWER VOLTAGE 100, 120, 220, 240V 50/60Hz POWER CONSUMPTION 20 watts (rated)

SEMICONDUCTORS 30 Transistors; 25 Diodes; 7 ICs. 1 FET

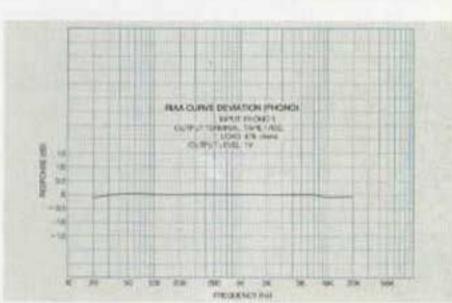
430mm (1615/16") W DIMENSIONS 168mm (6%") H

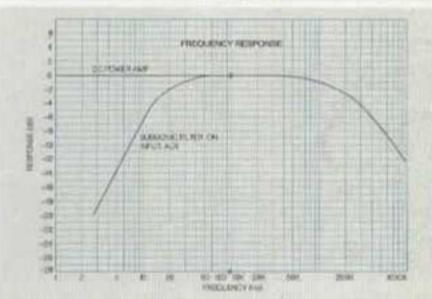
402mm (15%") D with Rack-mounting Adaptors and Back Stands 482mm (1815/16") W

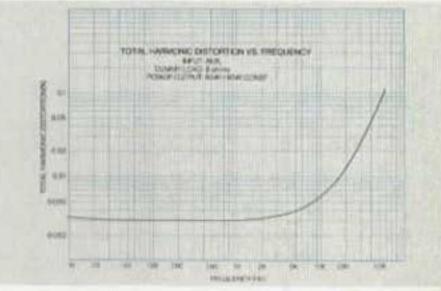
418mm (16%") D WEIGHT 8.7kg (19.2lbs.) Net with Rack-mounting Adaptors and Back Stands

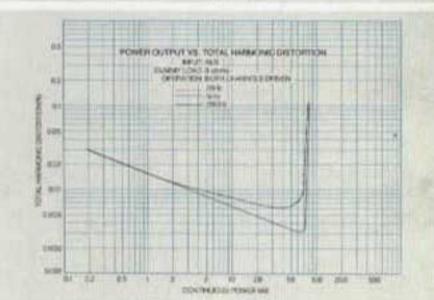
> 9.2kg (20.3lbs.) Net 11kg (24.3lbs.) Packed

168mm (6%") H









- * Power specifications measured pursuant to U.S. Federal Trade Commission trade regulation on power output claims for amplifiers.
- For European models, some specifications might change to comply with local safety regulations and standards.
- *The FM performance of the TU-517 is measured pursuant to the new Institute of High Fidelity standard. IHF-T-200, except specifications with a legend IHF-T-100.
- Design and specifications subject to change without notice for improvements.



Got a Match?

Balanced musical reproduction isn't something you can achieve by accident—or by hoping that your odd-ball collection of components will find themselves compatible.

Achieving the finest performance quality possible from state-of-the-art stereo amp and tuner designs isn't done by accident, either. Each and every "new" circuit design introduced to the high fidelity world promises "wonders." But unless those designs are materialized with the best available electronic parts, and deployed with regard to overall performance quality, you're better off hanging on to your old equipment.

Sansui finds a balance between the "tried and true" and the "new and wonderful" in the prestigeous AU/TU-517. The AU integrated "DC" stereo amplifier, on one hand, uses the same revolutionary power amplifier circuitry found in our more expensive

AU-717. The "DC" stands for "Direct Coupled," and the design gets rid of coupling capacitors and all the problems they cause.

On the other hand, the TU-517 stereo FM/AM tuner uses conventional state-of-the-art circuitry throughout. But uses it in such a refined way that the results are strictly hi-fi. The fact that we've raised selectivity, signal-to-noise, distortion and sensitivity parameters—which are usually considered mutually exclusive—proves it.

One good component deserves another. The new AU-517 integrated "DC" stereo amplifier and the TU-517 stereo FM/AM tuner are, literally, made for each other. And for balanced musical reproduction and the finest *overall* performance quality, you'll never find a better match. From Sansui, where it's *all* hi-fi.



Why "DC"?

The audio world is used to "new" advances and "startling" breakthroughs in technology. It's to be expected that hi-fi sound quality gets better with each successive generation of hi-fi equipment. But no one expected what DC amps would do to the state of the art—no one but Sansui. We are among the first in the world to incorporate highly advanced DC power amplifiers in stereo amps and receivers. Here's the background:

DC amplifier technology, as applied to audio, was still a novelty when we made our design decisions for the newest integrated stereo amplifiers in our distinguished AU line. But novelty or not, the advantages of DC are clearly heard in the more faithful reproduction of music achieved in the AU-517 (and AU-717/317).

DC or Direct Coupled amplifiers, by definition, use no capacitors in their negative feedback loops. Thus the connection of components—transistors, FETs, resistors, etc.—is made directly. Additionally, the DC power amp in the Sansui AU-517 has no input capacitor. Thus Sansui is proud to claim a "true DC" design. And as a result of the complete elimination of capacitors from the negative feedback loop, the inputs and the outputs, our design has the capability to amplify signals from the highest supersonics clear down to zero Hertz. And a zero Hertz signal, as you may know, is also called DC.

What are the DC benefits in musical terms? The very wide 200,000Hz to 0Hz (DC) frequency response in Sansui's AU-517 is one. Much lower distortion, including TIM or Transient Intermodulation distortion, is another.

The lower distortion, by the way, is the result of removing the major cause of distortion—the capacitors. The logic of DC amplification is as pure as the sound it offers.

The elimination of capacitors in the negative feedback loop, and in the normal signal path itself, gives the power amplifiers much faster transient response. In turn this means measurably and significantly much less TIM distortion is produced when pulse-like, momentary high-level signals enter the amplifiers (as the instant-by-instant content of music dictates). All DC amps are likewise less likely to create TIM in the middle and low frequencies because they keep the phase deviations of input signals to a nearly infinite zero at those frequencies. And all this can be proven by ears and 'scopes.

So far, all this can be applied to any DC amp. Where Sansui's own DC design shows the real improvements over the others is in the high frequencies. Because the DC power amplifier in the AU-517 has an incomparably wide frequency response (0~200,000Hz) it is able to expel the frequency range of high-frequency phase deviations far beyond the upper limit of the audible frequency spectrum, thus improving the quality of sound reproduction within that spectrum.

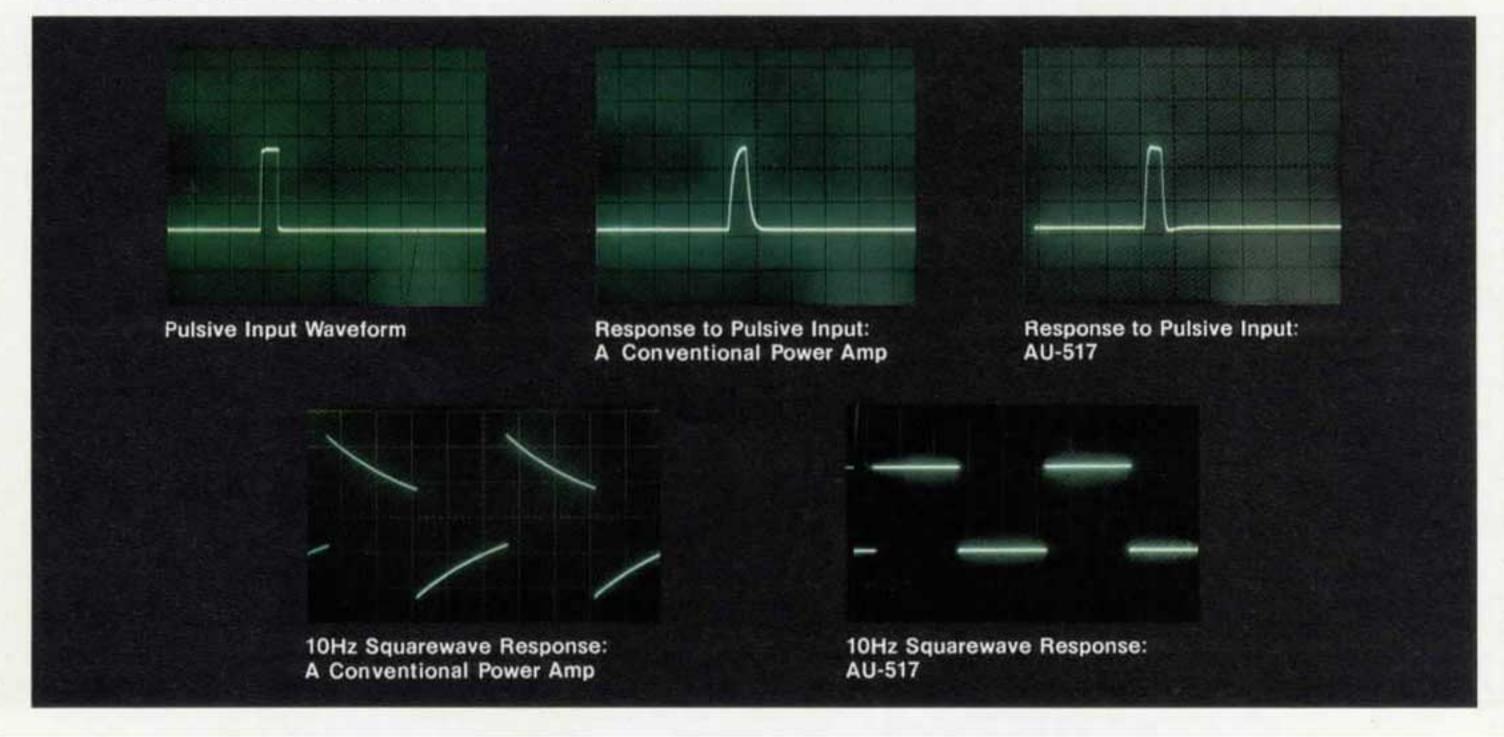
Finally there are the inter-related quantifiers

"slew rate" and "rise time." These terms might be new to you, so here is a brief explanation of each, and how they are used to measure how fast an amplifier can respond to input signals—a vital indicator of musical quality:

Slew rate shows how many volts an amplifier's output voltage can reach within one microsecond (1µsec), when a test input known as a square wave, with an instantaneously rising waveform, is applied to that amplifier. The higher the slew rate, the faster the amplifier responds to an input signal. When input signals, such as in music, are pulsive, an amplifier with a high slew rate is the one which will deliver the clearest, sharpest reproduction for realistic musicality.

Rise time, on the other hand, is a measurement of the time it takes an amplifier's output voltage to rise from 10% to 90% of the peak voltage of a square wave input. Rise time goes hand in hand with slew rate, because it translates the latter into a time factor. The smaller the rise time, the faster that amplifier can respond to an input signal.

Can such tiny little differences, measured sometimes in tenths and hundredths of a microsecond, make a real musical difference? Yes, especially when you consider that the subtle tonal changes that distinguish one musician, or even note, from the next take place so fast they can't be measured any other way.



AU517

Sansui-Exclusive DC Power Amp Configuration for Amaz Frequency Range and Ultra-Fast Rise Time/High Slew Ra

DC POWER AMP DESIGN

DC Configuration

The AU-517 with its DC power amp boasts highly accurate reproduction of all signals (including any kind of musical signals), and it achieves exceptionally high circuit stability. Most conventional amps achieve the latter without difficulty, but have trouble in accuracy. Ordinary DC amps are accurate enough, but notoriously unstable. The fact that we've achieved both accuracy and stability in the Sansui DC design is, we feel, an engineering triumph. Our power amp input is a dual-FET differential. Expensive, but effective in replacing the input coupling capacitor to achieve all the benefits of true DC. The input is driven by a high current and is especially good at improving the slew rate while drastically reducing TIM or Transient Intermodulation distortion.

The input is followed by a current-mirrorloaded second differential in a cascade connection arrangement. This circuit helps extend the frequency response of the DC power amplifier.

Yet another differential amp, this one in push-pull arrangement, comes next. It eliminates harsh 2nd harmonics, thus reducing "open-loop" distortion to a bare minimum. This distortion is lowered *before* the application of negative feedback, so less negative feedback is needed.

Overall, this "pre-driver" circuitry is so effective in assuring stable performance in

the face of temperature and voltage changes that Sansui has registered it with major patent offices around the world.

The "pre-driver" described above is followed by a 3-stage Darlington-connected driver stage. Then comes the final power output stage, built around highly linear heavy-duty power transistors in SEPP or Single-Ended Push-Pull design. The latter, of course, is OCL or Output Capacitor-Less, thanks to the DC configuration.

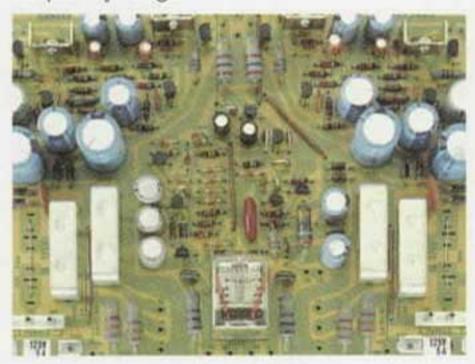
The benefits of this advanced team of circuits are numerous: You'll enjoy superwide frequency response from zero Hz (DC) to the ultra-sonic 200,000Hz. You'll hear greatly improved dynamic or transient response in your music, including the noticeable absence of TIM. The exceptionally high slew rate $(50V/\mu sec.)$ and fast rise time $(1.4\mu sec.)$ means more faithful reproduction of all types of input waveforms.

Low-Impedance Twin Power Supplies

Sansui is known for never underpowering any piece of hi-fi equipment. "Starving" a circuit and then expecting it to perform up to par is simply not good sense. This is why we've used two, independent power supplies in the AU-517, one for the left and one for the right channel. Each is formed of a power transformer, a rectifier circuit and a constant-voltage circuit. This dramatically reduces transient crosstalk and other forms of distortion. And it delivers a well-defined sound field with crisper, more transparent images.

Further, we've ensured low internal

impedance in the supplies, across a superwide frequency range, with the use of metallized mylar and other high quality capacitors. This advanced power supply is another good reason the AU-517 delivers accurate musical reproduction over a wide frequency range.



Dependable Twin Power Protection Circuits

Should the DC balance of the power amplifier ever be disturbed, two fail-safe circuits in the AU-517 prevent DC components from appearing at the speaker terminals to threaten your speakers. The two circuits are:

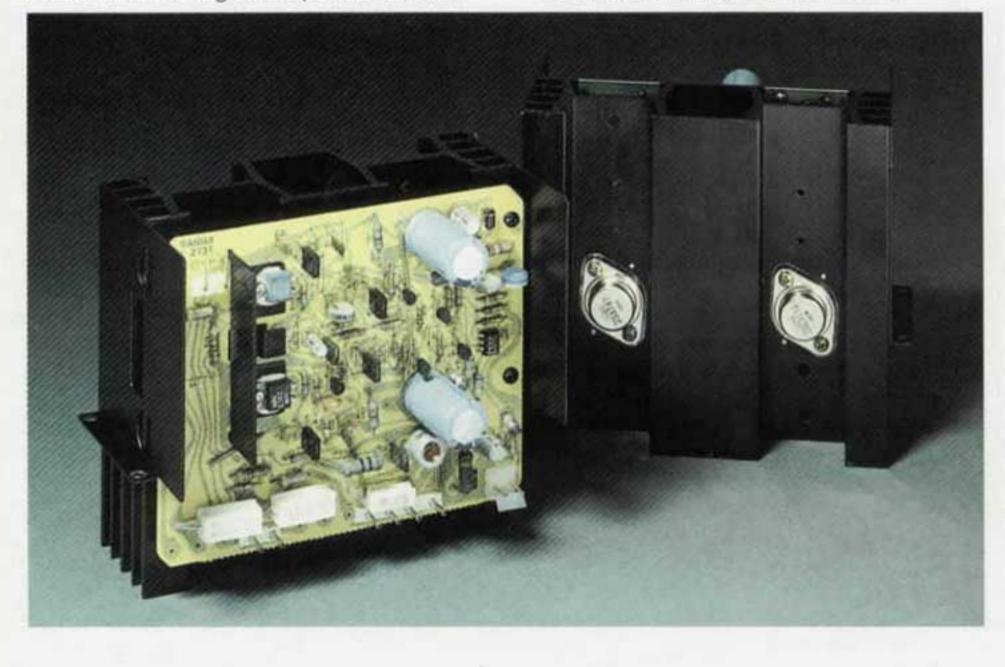
- DC VOLTAGE DETECTION CIRCUIT—
 It opens a relay to electrically separate your speakers from the output terminals if the voltage at speaker terminals ever drifts from the balanced zero values. No DC voltage, however minute, can ever reach your valuable speakers.
- OVERLOAD CURRENT DETECTION
 CIRCUIT—If ever a dangerously excessive
 current is drawn in the output power
 transistors due to output shorts or other
 accidents, the speaker output is instantly
 powered off to protect the power transistors
 from breakdown.

When and if either of these protection circuits is triggered, the LED Power Indicator on the front panel will flicker until you eliminate the cause. This indicator also flickers for a few seconds when you switch on the power, telling you that the circuits are being electrically stabilized.

The power transistors are further protected from breakdown due to excessive heat, for the heat sinks on which they are mounted have extra wide surface area to quickly dissipate heat as it is generated.

Other Power Amp Features

- Speaker Selector Switch positions for A, B, A+B, and OFF.
- Three AC Outlets—one switched (100 watts max.) and two unswitched (250 watts max.).



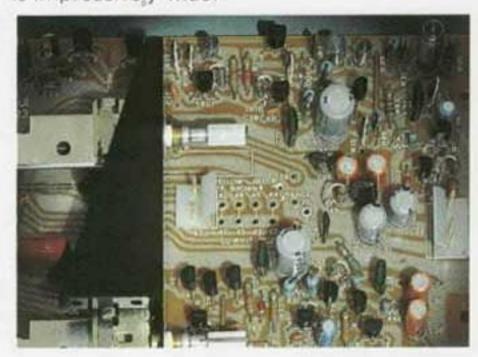
ing Zero Hz (DC) – 200kHz te.



PREAMPLIFIER DESIGN

Elaborate Phono Equalizer

Like the DC amplifier, the phono equalizer in the AU-517 is designed for minimum open-loop distortion, and requires little negative feedback. The circuit itself is an eleborate one, formed of eight low-noise transistors in each channel in the differential input with a current source. These are followed by an active-loaded Class-A amp with a buffer, in a true complementary SEPP output. Low-error metallized-film resistors and polypropylene capacitors contribute to overall quality such as nominal RIAA equalization of ±0.2dB over the range of 20 to 20,000Hz. Phono overload is a high 320mV RMS to comfortably accommodate even the highest input from a connected cartridge. Thus dynamic range is impressively wide.



NF Type Tone Control Circuit

Precision tone control is another advantage in the new AU-517. It features currentsource differential feedback (NF) amplifier and a pair of potentiometers for Bass and Treble with ±10dB adjusting capacities. The tone controls themselves have click stops for convenience. Finally, there's a Tone Defeat Switch that permits you to bypass the tone contol circuit for a purely unequalized "flat" response.

Subsonic Filter

Warped records can produce inaudible (subsonic) frequencies. When amplified, these can cause intermodulation distortion. The Subsonic Filter on the AU-517 will attenuate such harmful frequencies from 16Hz and below on a 6dB/oct, slope, yet keep musical content intact.

Precision Volume Control Pot

The potentiometer for master volume control on the AU-517 is the precision attenuator type with 32 accurately calibrated steps marked in decibels (dB). By a simple calculation, you know how much average power you're feeding to your speakers.

Two-Deck Tape Facilities

The AU-517 has full monitoring/recording/dubbing facilities for two stereo tape decks. All play/copy operations can be handled by a trio of switches and a rotary knob, permitting a number of practical uses. Here are some:

- You can route any selected program
 (Phono-1/2, tuner or AUX) to your speakers
 while at the same time dubbing or copying a tape from either connected tape deck to the other.
- You can route any selected program to your speakers while recording it on either

or both connected decks.

- You can play Phono-1/2 or AUX through your speakers while recording from Tuner on either or both decks. (This is a unique feature of the AU-517.)
- You can route taped material from either deck to your speakers while recording from any source on the other deck.
- You can monitor either deck at any time and perform A/B comparisons between source and recorded material from either deck, provided it is the 3-head type with separate record and playback heads.
- You can electrically disconnect tape decks from the AU-517 to avoid electrical interference, caused by the decks when unpowered.



Wait-There's More

- Loudness Control Switch.
- Preamp/Power Amp Separation—rearpanel terminals and a switch on the AU-517 let you separate the preamp and power sections for independent use.
- EIA Rack Mounting Brackets—they permit you to mount the AU-517 in the professional-styled EIA racks for convenience and easy operation.

TU517

Sacrificing Nothing in Clean Reproduction for Accurate Reception in this Hi-Fi Stereo FM/AM Tuner.



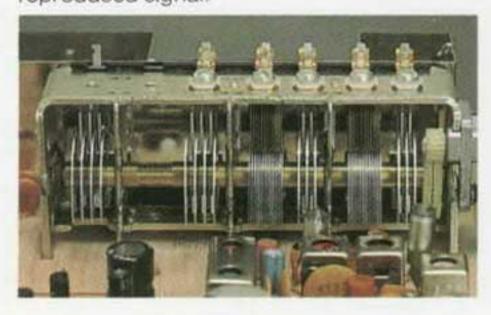
STRICTLY HI-FI RECEPTION

Precision FM Frontend

As you will learn, the reception and the reproduction abilities of Sansui's prestigeous TU-517 stereo FM/AM tuner are both strictly hi-fi. It all begins in the precision FM frontend, featuring a low-noise dual-gate MOS FET radio-frequency amp and a newly-designed, precision frequency-linear, widegap 4-gang tuning capacitor.

The latter has more frequency stability and more accuracy for tuning-dial calibration. And overall, the TU-517 achieves an amazing sensitivity to incoming signals.

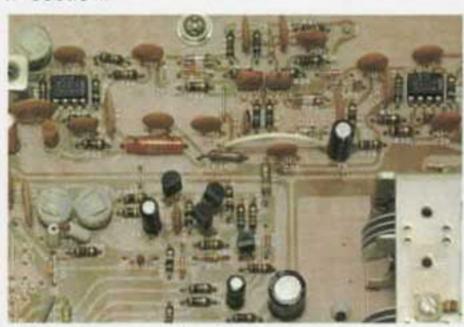
Objectifying this claim is easy. The TU-517's 50dB Quieting Sensitivity, for instance, is a high 34dBf (STEREO). As you may know, this specification relates to the strength of the incoming signal required for the tuner to achieve a signal-to-noise (S/N) ratio of 50dB or better. It is a truer measure of high fidelity quality than the old parameter, tied to an unsophisticated 30dB S/N. The 30dB S/N is hardly hi-fi, since it allows for as much as 3% distortion in the reproduced signal.



Low-Distortion IF Section

Helping to achieve the high 50dB Quieting Sensitivity of 34dBf, as explained above, are the ten differential amps formed of five ICs in the FM IF section of the TU-517. But the main advantage here is in superb selectivity. Selectivity in the AU-517, its ability to receive *only* the station you want while rejecting all others, is a high 50dB. This is true even when the *selectable* IF bandwidth switch is turned to WIDE.

There are not a few tuners which have this ability to pick out a single station, even in the face of neighboring stations of higher transmission power. But poor distortion performance usually accompanies this high selectivity. In the TU-517, neither reception nor reproduction quality is sacrificed, thanks to the use of linear-phase ceramic filters with low group-delay distortion, two Sansui-patented Group Delay Equalizers, and an array of low group-delay ICs—all in the FM IF section.



The FM IF input is formed of a low-noise transistor. The following limiting/amplifying stage is where the 10 differential amps, mentioned above, are found. An additional amplifier gives this section 11 different

amps in all.

The FM IF is fully shielded in a selfcontained circuit board of its own. This, plus its high-drive ratio detector (see below), enables the TU-517 to offer a high signalto-noise ratio of 82dB (MONO, 65dBf input signal) for noise-free hi-fi reproduction. It should be noted that this impressively high S/N remains nearly constant despite excessive changes in input level.

STRICTLY HI-FI REPRODUCTION

Wide-Range Ratio Detector

One of the most important factors in pure musical reproduction is transient response. And to help maintain the transients we use a newly-developed, wide-range ratio detector in the FM discriminator of the TU-517. It has a wide 1.4MHz peak-to-peak range, minimal differential-gain characteristics (kept below 0.5%) and wide ±450kHz bandpass characteristics. These work together to keep detection distortion to a minimum 0.06% (MONO), contributing to improved linearity and a higher S/N. For more stability and still less noise, we've housed the discriminator in a shielded casing, separate from the FM IF circuit board.

Low-Distortion PLL MPX Demodulator

Because the proven stability and alwayswide stereo separation qualities of the PLL or Phase-Locked Loop form of multiplex demodulator are so essential to top FM stereo performance, we've used it in the TU-517. Going a step further, we've put it in IC form to better withstand aging and changes in ambient temperatures. Then, by applying special feedback techniques to the IC and its peripheral components, we also have reduced switching distortion.

A further Sansui sophistication: a 38kHz Subcarrier Enhancer is added to prevent main-channel and sub-channel audio signals from mingling with the 38kHz subcarrier so that the 19kHz pilot signal is captured accurately. You hear no beat, even when recording to tape, and all distortion over 7kHz is drastically reduced for strictly hi-fi reproduction.

High-Accuracy Power Supply

Unshakable dependability. This is what a tuner's power supply must have to be truly hi-fi, and we've achieved it in the TU-517 with a high-accuracy voltage-regulating circuit. Because of its low-impedance operation, the supply ensures wide stereo separation, resolute stereo imaging and clean harmonic textures across the entire audio range.



USER-ORIENTED FEATURES

WIDE/NARROW IF Bandwidth Selector

This convenient switch has two positions
—WIDE and NARROW. Under normal
conditions you'll want the WIDE position to
ensure best hi-fi reception in FM: distortion
and other important hi-fi factors are optimized. However, in case the station you
want to hear is located too far away, or is
positioned on the dial in the midst of too
many other powerful stations, the NARROW
position provides a selectivity of 80dB to
help you pull it in with less distortion without
sacrificing hi-fi results.

Adjacent-Channel Filter

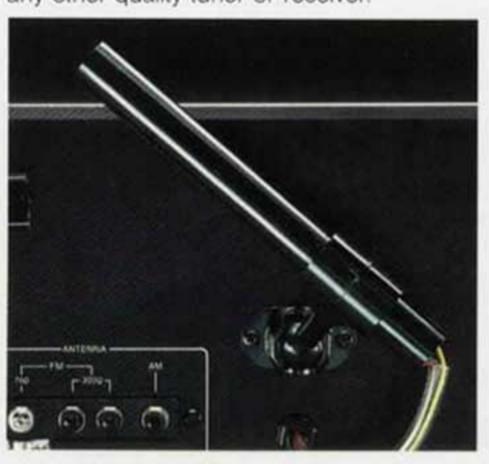
A newly-developed Adjacent-Channel Filter in the TU-517 improves adjacentchannel selectivity. It shows less groupdelay distortion than common "anti-birdie" filters.

FM Muting

We've employed a double-action muting circuit to eliminate inter-station tuning noise in FM. Isolation is better than 90dB.

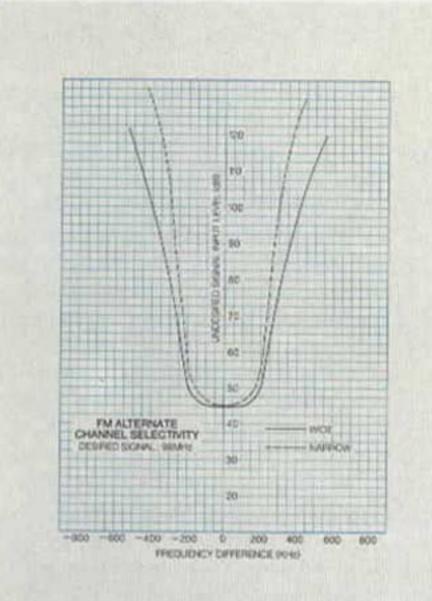
AM for People Who Hate AM

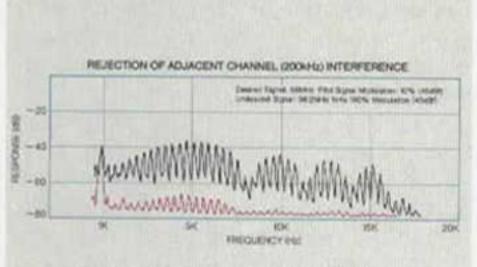
No AM can be called "hi-fi," especially in terms of frequency response. But with a frequency-linear 2-gang tuning capacitor for easy AM station selection, and with an exclusive high-integration IC for enhanced reliability, the TU-517 provides *listenable* AM fidelity at its best. Because the FM IF has ceramic filters and IF coils with improved selectivity characteristics, the bandwidth is wider than in conventional IF designs and the skirt characteristics sharper. We recommend the Sansui Compatible FM/AM Antenna System FA-7 for use with this or any other quality tuner or receiver.



AND THAT'S NOT ALL

- Noise Canceller Switch—substantially reduces noise in FM stereo.
- Twin Tuning Meters—accurate, lowdistortion reception more easily obtained.
- Adjustable Output Level—there's a level control to adjust output to your amp.
- 300-ohms/75-ohms FM Antenna Terminals—accept either high-impedance feeders or dependable coaxial cables.
- Flexible AM Bar Antenna—sensitive and easy to adjust.
- Frequency-Linear Dial—clear and accurate calibrations.
- EIA Rack Mounting—handles and feet are standard accessories for professionalstyle rack mounting.
- Handsome Matte Black Finish—the nonglare basic black matte finish on cabinet, chassis and controls is designed to complement the elegant simplicity of the matching AU-517 "DC" stereo integrated amplifiers from Sansui, where it's all hi-fi.





The two lines above, represent the spectra of beating with the adjacent-channel station, the lower one processed by Sansui's Adjacent-Channel Filter and the upper one not. A relatively low level of beating for the former means reduction of swishing noise across the entire audio range.

