SANSUI AU/TU517

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

Only hi-fi, everything hi-fi.
**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=46.1 S.M.P.T.E. method)
less than 0.01% at or below rated min. RMS power output
distortion

**DAMPING FACTOR**
(1 kHz, both channels driven)
60 into 8 ohms

**RISE TIME**
1.4µSec

**SLEW RATE**
50V/µSec

**FREQUENCY RESPONSE**
(±1 watt)
from POWER AMP IN to POWER AMP OUT
DC to 20,000Hz +0dB, -3dB

**OVERALL FROM AUX**
5 to 100,000Hz +0dB, -3dB

**R.I.A.A. CURVE DEVIATION**
from 20 to 20,000Hz
+0.25dB, -0.25dB

**INPUT SENSITIVITY AND IMPEDANCE**
(at 1.0kHz)
PHONO 1, 2
2.5mV, 47k ohms
TAPED REK
150mV, 600 ohms
AUX, TUNER, TAPE PLAY
150mV, 47k ohms

**MAXIMUM INPUT CAPABILITY**
(at 1.0kHz 0.01% T.H.D.)
PHONO 1, 2
60mV RMS
TAPE REC
150mV/600 ohms into 7K ohm load
PREAMPLIFIER OUTPUT
1V/75 ohms into 47K ohm load
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
90dB

**CHANNEL SEPARATION**
(at 1.0kHz)
PHONO 1, 2
60dB
AUX, TUNER, TAPE PLAY
95dB

**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
4 switched total 260 watts

**POWER REQUIREMENTS**
POWER VOLTAGE
100, 120, 220, 240V 50/60Hz
POWER CONSUMPTION
345 watts

**SEMI-CODCTORS**
63 Transistors; 2 Diodes; 10 Zener Diodes; 1 LED; 2 FETs

**DIMENSIONS**
430mm (16 3/4") W
168mm (6 5/8") H
389mm (15 1/3") D

**WEIGHT**
16.5kg (36.4lbs) Net
18.5kg (40.8lbs) Packed

**TU-517**

**FM SECTION**
**TUNING RANGE**
88 to 108MHz

**SENSITIVITY**
MONO
9.5dB (IHF T-100 1.7µV)
STEREO
19.0dB (IHF T-100 4.9µV)

**50MB QUIETING SENSITIVITY**
MONO
12.5dB (IHF T-100 2.24µV)
STEREO
45dB (IHF T-100 27.5µV)

**SIGNAL TO NOISE RATIO AT 85DB**
MONO
82dB
STEREO
78dB

**FREQUENCY RESPONSE**
MONO Wide
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 0.15% 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**
MONO
18dB
STEREO
16dB

**ADJACENT CHANNEL SELECTIVITY**
MONO Wide
35dB (at 200kHz)
NARROW
88dB (at 200kHz)
STEREO Wide
50dB (at 400kHz)
NARROW
60dB (at 400kHz)

**SPURIOUS RESPONSE RATIO**
MONO Wide
90dB (at 99MHz)
STEREO Wide
50dB (at 99MHz)
RF INTERMODULATION
MONO Wide
65dB (at 99MHz)
STEREO Wide
50dB (at 99MHz)
AM SUPPRESSION RATIO
60dB (at 99MHz)
STEREO Separation
45dB at 100Hz
45dB at 1000Hz
45dB at 10000Hz
36dB from 30 to 15,000Hz
60dB

**ANTENNA INPUT IMPEDANCE**
500 ohms balanced
75 ohms unbalanced

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

**AM SECTION**
TUNING RANGE
530 to 1,600kHz
SENSITIVITY (BAR ANTENNA)
470µV/m (220µV/m)

**SELECTIVITY (+10kHz)**
35dB

**IMAGE RESPONSE RATIO**
38dB at 1,000kHz

**GENERAL**
POWER REQUIREMENTS
POWER VOLTAGE
100, 120, 220, 240V 50/60Hz
POWER CONSUMPTION
345 watts

**SEMI-CODCTORS**
30 Transistors; 25 Diodes; 7 FETs

**DIMENSIONS**
430mm (16 3/4") W
168mm (6 5/8") H
389mm (15 1/3") D

**WEIGHT**
16.5kg (36.4lbs) Net
18.5kg (40.8lbs) Packed

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*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

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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 prestigious 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 "starting" 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 Amazing Frequency Range and Ultra-Fast Rise Time/High Slew Rate

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-mirror-loaded 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 super-wide 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/μsec.) and fast rise time (1.4μsec.) 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 super-wide frequency range, with the use of metalized 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.).
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 elaborate 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 polycarbonate capacitors contribute to overall quality such as nominal RIAA equalization of ±0.2dB over the range of 20 to 20,000Hz. Phono overloads a high 320mV RMS to comfortably accommodate even the highest input from a connected cartridge. Thus dynamic range is impressively wide.

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 dB/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—rear-panel 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.

NF Type Tone Control Circuit
Precision tone control is another advantage in the new AU-517. It features current-source 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 control circuit for a purely unequalized “flat” response.
TU517
Sacrificing Nothing in Clean Reproduction for Accurate Reception in this Hi-Fi Stereo FM/AM Tuner.

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.

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 wide 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

Precision FM Frontend
As you will learn, the reception and the reproduction abilities of Sansui's prestigious 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, wide-gain 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.

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 self-contained circuit board of its own. This, plus its high-drive ratio detector (see below), enables the TU-517 to offer a high signal-to-noise ratio of 82dB (MONO, 65dB 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.
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.

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.

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 adjacent-channel selectivity. It shows less group-delay distortion than common "anti-birdie" filters.

AND THAT'S NOT ALL
- Noise Canceller Switch—substantially reduces noise in FM stereo.
- Twin Tuning Meters—accurate, low-distortion 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 professional-style rack mounting.
- Handsome Matte Black Finish—the non-glare 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.