

# Accuphase E-202 T-101

E-202 INTEGRATED STEREO AMPLIFIER T-101 VARIA-BAND FM STEREO TUNER



# Accuphase E-202

INTEGRATED STEREO AMPLIFIER

The Accuphase E-202 is a top class Integrated Amplifier with separate component grade features and characteristics. It is guaranteed to have a power output of 100 watts per channel into 8 ohms with both channels driven, and distortion at less than 0.1% from 20 to 20,000 Hz. Full play has been given in its development to the advanced engineering techniques applied in the P-300 Power Amplifier and the C-200 Control Center, which earlier marked the introduction of the Accuphase series of highest quality audio equipment. The deep reverberating sound quality and expression of music detail that is heard through an extra powerful amplifier can be far more dynamic and inspiring than sound from an ordinary amplifier. However, powerful amplifiers that may sound good at high volume levels often fail to sound as well at low listening levels. This is because technically, the higher the power, the more difficult it becomes to capture clearly the very soft, delicate passages of music. The "difference" in Accuphase sound becomes readily apparent during reproduction of such soft passages, or when listening at low volume, since the E-202, like the P-300, was designed to ensure clear, clean sound quality at ALL listening levels.

There has been much discussion recently concerning amplifier and speaker connections and the harmonious relation between them. This can be said to reflect the feeling of a growing number of audiophiles that more could be done by amplifier manufacturers to make their products better able to induce the maximum potential performance from any speaker, and enhance a speaker's characteristic tonal qualities.

The Speaker Damping Control feature of the Accuphase E-202 is a perfect answer to this question as it can change the speaker damping factor quickly, and thus reveal a speaker's maximum sound reproducing capabilities and characteristic tonal qualities immediately.

## FEATURES

1. High power output of 100 watts per channel into 8 ohms with clean sound quality at ALL listening levels.

This high power capability, with distortion at less than 0.1% from 20 to 20,000 Hz is fully guaranteed. Heavy duty power transistors in a parallel push-pull drive output stage and large heat sinks back up this Accuphase warranty.

High power amplifiers need an especially reliable power supply that must not only provide the energy to drive the speakers, but the capacity to store and deliver adequate power to trace the sharpest fluctuating signal. The E-202 has just such a power supply with an oversize power transformer and two giant 20,000  $\mu$ F filter capacitors that can easily supply the energy required to deliver 280 watts of continuous power into 4 ohms. A severe rise in distortion when volume is reduced to low levels is a problem with many high power amplifiers, but not so with the E-202 in which such distortion has been eliminated to the lowest possible limit. It permits enjoyment of clean, clear pianissimo passages at ALL volume levels.

2. Speaker Damping Control enhances characteristic tonal qualities of speakers.

The damping factor of solid state amplifiers is generally very large and ideal for damping the speakers. However, some speakers require an amplifier with a low damping factor to reproduce rich, full-bodied sound. The E-202 has a Speaker Damping Control which permits choice of three damping factors and induces maximum potential performance from any speaker. Damping factor with an 8 ohm load becomes more than 50 when this control is set to NORMAL. Likewise, it is 5 at MEDIUM position, and 1 at SOFT position. It enables choosing the speaker sound that one prefers.



3. Power Level Meters indicate power output  
The E-202 has separate power meters for the left and right channels which indicate power output in decibels (dB). A Meter Sensitivity Control permits selection of the following three meter sensitivities, and respective power output indications: 0dB (0dB=100W); -10dB (0dB=10W); and -20dB (0dB=1W).

4. High fidelity equalizer circuits

(a) This circuit can handle inputs up to 300 mV RMS with distortion at less than 0.1% at 1 kHz, and ensures faithful passage of practically any size pulse. It is a direct coupled, 3-stage, constant current load, differential amplifier which has outstanding linearity characteristics. It is supplied by a dual (positive and negative) power supply system which accounts for its very high performance.

(b) This amplifier also has a Disc Low Enhancement Switch, an exclusive Accuphase feature, and a Subsonic Filter that were first introduced and favorably recognized in the C-200 Control Center. The Disc Low Enhancement Switch permits +1dB enhancement of the RIAA recording standard at 100 Hz, and enables delicate application of "Presence" to music that is not possible with ordinary tone controls. The Subsonic Filter eliminates any possibility of intermodulation distortion that may originate from turntable vibrations and/or tone arm resonance and ensures high quality disc record reproduction.

(c) DISC 1 input impedance selector.

The correct matching impedance for phono cartridges depends on the cartridge, as well as the type and length of the shielded phono cord that is used. This selector provides choice of three matching impedances, 30 K ohms, 47 K ohms or 100 K ohms to obtain highest quality sound.

5. BASS/TREBLE Control provides 2 dB tone variation

The BASS/TREBLE Control provides maximum tone variation between 100 Hz to 10 kHz over a range of  $\pm 10$  dB in accurate steps of 2 dB. It can be switched on or off with an independent switch.

6. Three tape decks can be connected and two operated. Tape Copy Switch is independent.

Two tape decks can be operated simultaneously in conjunction with this amplifier. It also has an input/output jack on the front panel to which a third tape deck can be connected. Connection of the third tape deck to the front panel jack automatically cuts off one of the tape decks connected to the rear panel connector. An independent tape copying switch also permits tape copying from one tape deck to another, while listening simultaneously to another program source.

7. Well-regulated power supply assures outstanding stability.

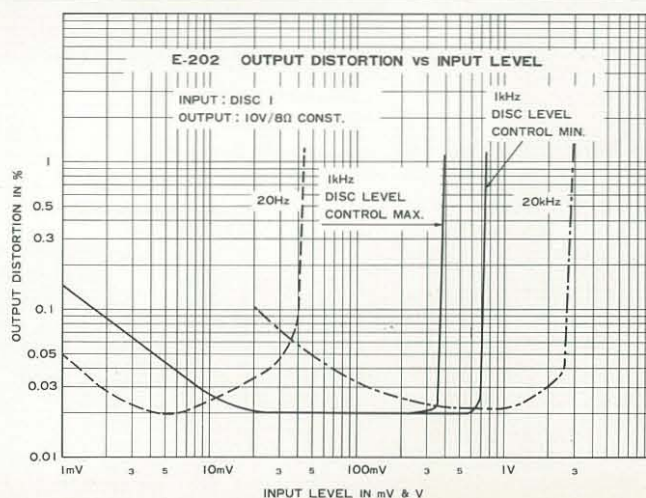
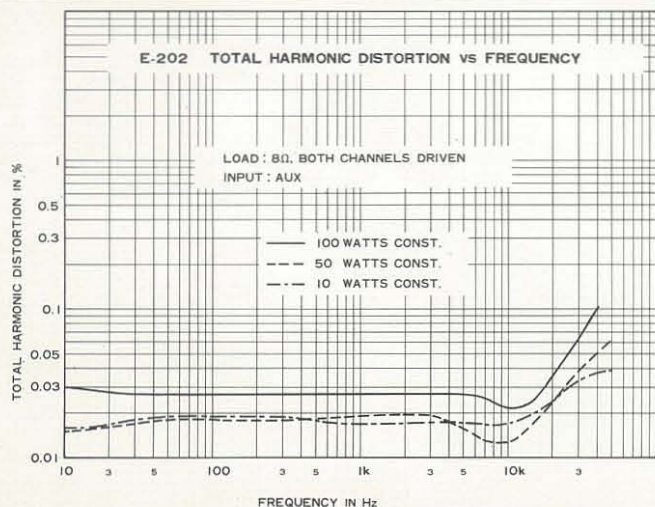
Even a slight power supply voltage fluctuation during periods of sharp signal fluctuations will cause a severe deterioration of sound quality. A special regulated power supply in the E-202 delivers constant, nonfluctuating voltages to every amplifier stage, excepting the output circuit which is supplied separately, regardless of the signals handled.

8. Foolproof Protection Circuit safeguards power transistors and speakers.

The E-202 has a built-in Protection Circuit which guards against damage to speakers or power transistors in case of shorts when the speakers are connected, or when abnormally low impedance output load connections are made. If the speakers are shorted, this circuit automatically cuts them from the amplifier.

9. Carefully selected parts.

The same kind of parts that were developed and chosen for the P-300 and C-200 have been used in this integrated amplifier. They are selected carefully with "performance first" in mind, after undergoing severe durability and tolerance tests to determine how their characteristics affect sound quality.



# Accuphase T-101

## VARIA-BAND FM STEREO TUNER

FM broadcasts which offer a variety of good music day in and day out are just as important as disc records to most audiophiles as a high quality program source. To receive and reproduce them to the highest perfection that advanced engineering techniques permit, Kenosonic Laboratory first introduced the Accuphase T-100 AM-FM Stereo Tuner which received such high recognition. Now we have also developed the Accuphase T-101, an exclusive FM Stereo Tuner, for the many FM fans who appreciate good music and better sound.

Our basic policy in developing the T-101 was the same as that for the T-100 — that is, to develop a tuner that "can bring the broadcasting studio right into the home." This, of course, meant a tuner that was capable of separating all noise and distortion that have mixed with the FM signal during its transmission to the receiver, and reducing them to below audible level, while faithfully retaining the original broadcast quality. It also meant a tuner that would not be affected by external factors such as temperature, humidity and varying input levels, nor a lapse of time and one with a perfectly smooth tuning mechanism. In addition, extra special attention was paid to the following two points in designing the T-101.

### (1) Relation between selectivity and distortion.

New IHF standards for tuners call for measurement of selectivity, not only at 400 kHz, but also at 200 kHz, since many new stations are increasing the problem of adjacent channel selectivity at 200 kHz. However, improvement of selectivity at the latter point adversely affects F phase characteristics, and necessitates a compromise with distortion level. Moreover, it is expensive to make high sensitivity compatible with low distortion even for a compromise solution, due to the high cost of required elements.

Since adjacent channel interference is not a problem with every FM station, however, we developed a variable selectivity tuner and concentrated our design on sharp selectivity for reception that requires critical separation, and stressed lowest distortion for reception where there is no noise elimination problem. In short, we came up with a single tuner that could be switched to give maximum performance priority to either selectivity or low distortion, depending on the nature of the incoming signal. Even when concentrating on selectivity, however, we never lost sight of the fact that "Hi-Fi" reception was a primary aim.

### (2) Checking the quality of the incoming signal

The quality of an incoming FM signal is very important for high quality reception. Even the best tuners will not be able to correct a distorted FM input signal. For this reason an independent Multipath Meter was provided on the front dial with which multipath effects on input signal quality can be checked and corrected.

## FEATURES

### 1. High stability front end.

The FM signal from the antenna enters the RF amplifier where it is amplified after being selected by the tuning circuit. It is then mixed with the local oscillator signal in the mixer circuit and converted into a 10.7 MHz IF signal. This circuitry is known as the front end, and it functions as the "brain" of the tuner. Weak signals are amplified, strong signals are passed through without adding distortion, and all types of noise interference are reduced to insignificant levels.

The front end of the T-101 is equipped with a frequency linear 4-gang variable capacitor, dual gate MOS FET transistor circuitry and local oscillator that is isolated by a buffer circuit. It guarantees high performance characteristics that include wide dynamic range input, spurious signal rejection over 100 dB and image rejection over 80 dB. Its 245 mm long dial scale is marked off at 250 kHz intervals and permits smooth, easy tuning together with a precision dial mechanism that is absolutely free of backlash.

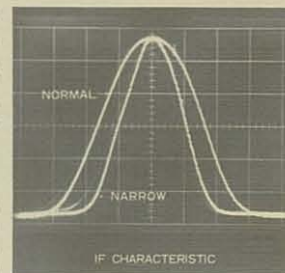
### 2. Variable selectivity IF circuit

The 10.7 MHz signal from the front end enters the IF circuit where it is amplified, and the amplitude controlled signal is then sent on to the detector circuit.

In addition to its amplifying function, the IF circuit also blocks the passage of unwanted noise and interference such as the strong signals of an adjacent station. The T-101 has a variable selectivity IF circuit which is comprised of a newly developed 10-element linear phase lumped filter and a sharp selectivity piezoelectric filter to carry out this function. Only the linear phase lumped filter is used under normal conditions. When adjacent station interference is encountered, the Selectivity Switch can be set to NARROW to add the piezoelectric filter. This effectively reduces this interference and produces clear reception of the desired station.

Even when the SELECTIVITY switch is set to NARROW, distortion is still less than 0.5% (monophonic reception at 1 kHz), and sound quality does not deteriorate.

The NARROW position causes a slight deterioration in distortion ratio, which, for all practicable purposes, is negligible. The Selectivity Switch should be set to NORMAL when there is no interference. It is the position which provides highest quality, distortion-free reception.



### 3. Wideband detector circuit

The amplified signal from the linear phase lumped filter and the IF amplifier is then demodulated into a distortion-free audio signal in the detector stage. It features a discriminator circuit that has an extra wide bandwidth of 1200 kHz. This is three times the normal range and is a big factor in greatly improving stereo characteristics.

### 4. Phase locked loop stereo demodulator

The demodulated audio signal is then separated into left and right channel stereo signals by a newly designed phase locked loop stereo demodulator that has no coil-capacitor circuits. This stereo demodulator automatically synchronizes the phase of the broadcast pilot signal with that of the subcarrier oscillator, and provides high stability, good stereo separation and big improvement of other stereo characteristics.

### 5. Independent Multipath Meter

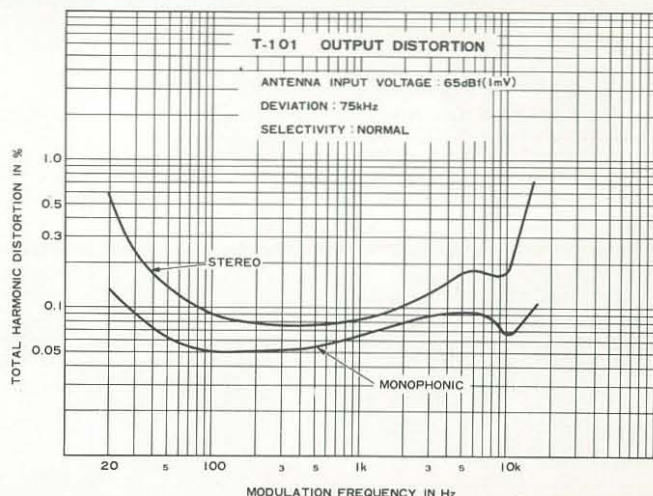
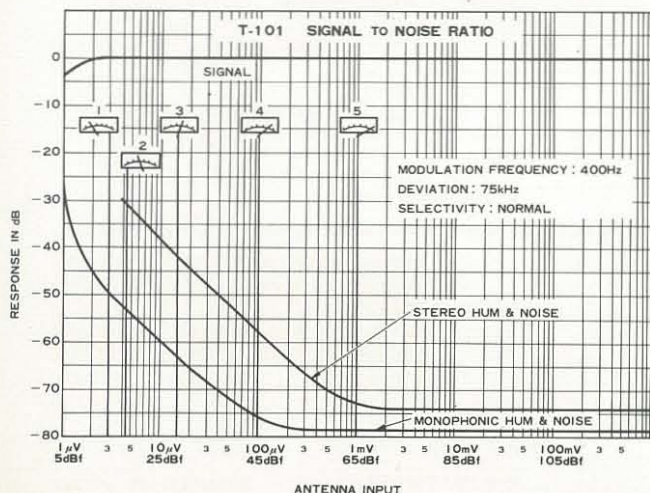
An independent Multipath Meter is provided besides a Signal Strength Meter and a Center Tuning Meter. This meter helps to check and correct multipath interference which can cause stereo distortion and poor reception.

### 6. Other features.

This tuner has a Stereo Only switch besides a Muting Switch and a Stereo Noise Filter. It provides both fixed level and variable outputs so that a Tape Deck can be connected directly to the former and an amplifier to the latter.

Detector output terminals are also available where a demodulator can be connected to enable reception with this tuner of FM 4-channel broadcasts when they are started in the future.

●THE MODELS ARE PHOTOGRAPHED IN WOODEN CABINET WHICH IS OPTIONAL.



## INTEGRATED STEREO AMPLIFIER "Accuphase" E-202 GUARANTY SPECIFICATIONS

**POWER OUTPUT:** (both channels driven from 20Hz to 20,000Hz with no more than 0.1% total harmonic distortion):  
 140 watts per channel, min. RMS, at 4 ohms  
 100 watts per channel, min. RMS, at 8 ohms  
 50 watts per channel, min. RMS, at 16 ohms

**TOTAL HARMONIC DISTORTION:** (from 20Hz to 20,000Hz at any power output from 1/4 watt to rated power)  
 4 ohms; 0.15% max.  
 8 ohms; 0.15% max.  
 16 ohms; 0.15% max.

**INTERMODULATION DISTORTION:** (High Level Input to Main Output)  
 will not exceed 0.1% at rated power output for any combination of frequencies between 20Hz and 20,000Hz

**FREQUENCY RESPONSE:** Main Amp. Input: +0, -0.2dB  
 High Level Input: +0, -0.5dB  
 Low Level Input: +0, -1.0dB  
 (at rated power output from 20Hz to 20,000Hz)

**DAMPING FACTOR:** (at 8 ohms load, 20Hz to 20,000Hz) with "SPEAKER DAMPING" switch set to:  
 "NORMAL" "MEDIUM" "SOFT"  
 50 5 1

**INPUT SENSITIVITY AND IMPEDANCE:**  
 Disc 1; 2.5-5mV\*; 30K ohms, 47K ohms, 100K ohms  
 Disc 2; 2.5mV; 47 kohms  
 High Level Input: 160mV; 100K ohms  
 Main Amp. Input: 1.0V; 100K ohms  
 (\*2.5-5mV variable)

**MAXIMUM INPUT FOR LOW LEVEL INPUT:**  
 Disc 1; 300mV RMS at disc level control maximum for 1kHz  
 Disc 1; 600mV RMS at disc level control minimum for 1kHz  
 Disc 2; 300mV RMS  
 (distortion 0.05% at 1 kHz)

**OUTPUT LEVEL AND IMPEDANCE:**  
 Preamp. Output; 1.0V, 600 ohms (at rated input level)  
 Tape Rec. 1, 2; 160mV, 200 ohms (at rated input level)

**HEADPHONE JACK:**  
 For listening with low impedance (4-32 ohms) dynamic stereo headphones

### VOLTAGE AMPLIFICATION IN DECIBELS:

Main Amp. Input to Output; 29 dB  
 High Level Input to Preamp. Output; 16dB (at VOLUME control maximum)  
 Low Level Input to Tape Rec.; 36dB (Disc 1 level control provides 6dB variation)

**HUM AND NOISE:** Main Amp. Input; 94dB below rated output  
 High Level Input; 80dB below rated output  
 Low Level Input; 74dB below rated output  
 when adjusted for 10mV input at 1kHz

**BASS/TREBLE controls:** 10-step Rotary Switch for both channels with ON-OFF switch. Tone is varied in 2 dB steps.

BASS turnover frequency; 400Hz, ±10dB at 100Hz  
 TREBLE turnover frequency; 2.5kHz, ±10dB at 10,000Hz

**VOLUME control:** Less than 1dB tracking error.

**COMPENSATOR:** ON position boosts low frequencies for low level listening.  
 +9dB boost at 50Hz when the volume knob is adjusted to -30dB position.

**DISC LOW ENHANCEMENT (for Disc Input):**  
 +1dB at 100Hz to RIAA standard characteristics with "LOW ENHANCE" switch set to ON position.

**FILTERS:** Disc Subsonic Filter; 25Hz cutoff 6dB/oct  
 Low Filter; 30Hz cutoff 18dB/oct  
 High Filter; 5kHz cutoff 12dB/oct

**POWER LEVEL METER:**  
 Meter is calibrated to read 0dB when amplifier produces 100 watts into 8 ohms load.  
 METER RANGE switch is provided to increase meter sensitivity by 10dB or 20dB.

**OUTPUT LOAD IMPEDANCE:** 4, 8 and 16 ohms

**POWER REQUIREMENT:**  
 Voltage selector for 100V, 117V, 220V, 240V 50/60Hz operation  
 Consumption: 70 watts at zero signal output  
 375 watts at rated power output into 8 ohms load

**SEMICONDUCTOR COMPLEMENT:**  
 53 Transistors, 4 FET's, 44 diodes, 2 Thermistors

**DIMENSIONS:** 455mm (18 inches) wide, 152mm (6 inches) high, 355mm (14 inches) deep

**WEIGHT:** 19.5 kgr. (42.9 lbs.) net, 23.8 kgr. (52.3 lbs) in shipping carton.

## VARIA-BAND FM STEREO TUNER "Accuphase" T-101 GUARANTY SPECIFICATIONS

### PERFORMANCE GUARANTY:

Products of Accuphase guarantee specifications stated.  
 All specifications are measured in accordance with the new IHF measurement method.

### Monophonic Performance

**SENSITIVITY:** Usable Sensitivity: 11 dBf (2.0 μV\*)  
 50 dB Quieting Sensitivity: 18 dBf (4.5 μV\*)  
**VOLTAGE STANDING WAVE RATIO:** 1.5  
**SIGNAL TO NOISE at 65 dBf (1 mV\*):** 75 dB  
**DISTORTION:** with SELECTIVITY switch set to "NORMAL"  
 65 dBf (1 mV\*) Input: 100 Hz 1,000 Hz 10,000 Hz  
 0.1% 0.1% 0.2%

**INTERMODULATION DISTORTION:** will not exceed 0.2%  
 (Antenna input 65 dBf (1 mV\*), 100% mod., 14kHz and 15kHz=1:1)

**FREQUENCY RESPONSE:** +0, -1 dB 20 Hz to 15,000 Hz  
**SELECTIVITY:**

with SELECTIVITY switch set to "NORMAL" "NARROW"  
 Alternate Channel: 55dB 100dB  
 Adjacent Channel: 6dB 20dB

**CAPTURE RATIO:** 2.0dB  
**RF INTERMODULATION:** 70dB  
**SPURIOUS RESPONSE RATIO:** 100dB  
**IMAGE RESPONSE RATIO:** 80dB  
**IF RESPONSE RATIO:** 100dB  
**AM SUPPRESSION RATIO:** 55dB  
**SUBCARRIER PRODUCT RATIO:** 70dB  
**SCA REJECTION RATIO:** 60dB  
**OUTPUT:** 2.0 Volts

### Stereo Performance

**SENSITIVITY:** Usable Sensitivity: 31 dBf (20 μV\*)  
 50dB Quieting Sensitivity: 38 dBf ((45 μV\*)  
**SIGNAL TO NOISE at 65 dBf (1 mV\*):** 70dB  
**DISTORTION:** with SELECTIVITY switch set to "NORMAL"

65 dBf (1 mV\*) Input: 100Hz 1,000 Hz 10,000Hz  
 0.2% 0.2% 0.5%

**INTERMODULATION DISTORTION:** will not exceed 0.2%  
 (Antenna input 65 dBf (1 mV\*), Standard Stereo mod. 10kHz)

**FREQUENCY RESPONSE:** +0, -1dB 20Hz to 15,000Hz  
**STEREO SEPARATION:** 100Hz 1,000Hz 10,000Hz  
 35dB 45dB 30dB

**STEREO AND MUTING THRESHOLD:** 19 dBf (5 μV\*)  
 (\* old IHF methods at 300 ohms)

### General

**TUNING CAPACITOR:** Frequency Linear 4-gang  
**OUTPUT IMPEDANCE:** Audio Output FIXED; 200 ohms  
 Audio Output CONTROLLED; 2.5K ohms

**FM ANTENNA INPUTS:** 300-ohm balanced; 75-ohm unbalanced  
**METERS:** Signal Strength Meter Center Tuning Meter  
 Multipath Meter

**TUNING RANGE:** 88MHz to 108MHz

**POWER REQUIREMENT:**  
 Voltage selector for 100V, 117V, 220V, 240V 50/60Hz operation  
 Consumption: 26 watts

**SEMICONDUCTOR COMPLEMENT:**  
 2 FET's, 7 IC's, 25 Transistors, 24 Diodes  
**DIMENSIONS:** 455mm (18 inches) wide, 152mm (6 inches) high, 355mm (14 inches) deep

**WEIGHT:** 11.1 kgr. (24.4 lbs) net, 15.4 kgr. (33.8 lbs) in shipping carton.

**Accuphase**  
 KENSONIC LABORATORY INC.