

ACOUSTAT

**TRANS-NOVA[®]
TWIN-200**

OWNER'S MANUAL

INTRODUCTION

Congratulations on your purchase of the Acoustat Trans-Nova Twin-200 power amplifier, the most innovative NEW technology in audio amplification devices. With proper installation and use, this amplifier should provide many years of trouble free music enjoyment. Please be certain to read this manual over completely to familiarize yourself with your new amplifier before placing it in service.

WARRANTY STATEMENT

A limited 5 year warranty from date of purchase is provided by Acoustat on the TNT-200 power amplifier. This applies to the original purchaser only. However, because Acoustat feels that a fine audio product should be warranted regardless of owner, the warranty is transferable to all subsequent owners, based not upon date of original purchase, but upon original date of manufacture. This warranty is subject to the conditions and limitations stated within the documents on page 9 of this manual.

It is your responsibility to complete and return the warranty registration card. While this card does not determine your eligibility for warranty, it will allow Acoustat to inform you of any possible updates to the amplifier, as well as any new product news that may be of interest to you. This warranty card also aids Acoustat in its efforts to bring fine audio components to music lovers everywhere, by using the additional information that you provide. So PLEASE fill it out completely and return within 20 days of purchase.

USE CAUTIONS

The Acoustat TNT-200 power amplifier is unique in its ability to maintain an exceptionally wide bandwidth at high power levels (100 watts at 400K Hz). For this reason, the TNT-200 could amplify RF at its input, and if present at abnormally high levels, the amplifier can blow its internal fuses. Large amounts of DC at the input will have a similar effect. While a properly functioning preamplification system will not cause any problems, some systems have been shown to exhibit one or both of the above malfunctions.

Whereas DC at the amplifier's input at high enough levels to cause troubles must certainly be considered caused by a defective component, RF interference may be the result of close proximity to a transmitter. If this is the case in your particular application, Acoustat has provided a location on the main printed circuit boards for an additional RF filter capacitor to be installed. While the addition of this RF filter may cause some minor sonic degradation in the best audio systems, it will, however, solve any problems associated with severe RF interference. If your application suggests use of this filter, please call the factory service department at 305/462-6700 for instructions on how to accomplish this modification.

FUSES

The TNT-200 amplifier has six fuses, all located internally. The four 5 amp slo-blo rail fuses are located directly on the PC boards of each amplifier channel. The two 7½ amp slo-blo line fuses are located on the center chassis brace, close to the AC line cord. ALL fuses are slo-blo type, which MUST BE REPLACED WITH THE SAME VALUE. A hex-key wrench has been provided for removal of the top and bottom cover (four screws) if the need to replace fuses does arise. Two spare fuses are provided also.

There are NO speaker protection fuses in the TNT-200. Since this amplifier is capable of very high power output, you should consult your speaker's owner's manual for any recommendations on speaker fusing - to prevent possible damage to the speaker by over-powering.

PACKAGING

SAVE ALL PACKAGING MATERIALS. Your Acoustat amplifier is a precision electronic instrument and must be properly cartoned whenever shipment is necessary. ONLY the original packaging will insure safe transport. (If lost or damaged, replacement cartons can be obtained from Acoustat at a nominal charge.)

WARNING

TO PREVENT ELECTRICAL SHOCK OR FIRE HAZARD, DO NOT EXPOSE THIS EQUIPMENT TO RAIN OR MOISTURE. DO NOT OPERATE WITH COVERS REMOVED. REFER ALL SERVICING TO QUALIFIED PERSONNEL.

INSTALLATION

It is important that adequate airflow above and below the unit be provided. The special feet used on the amplifier are designed to provide adequate spacing only when the unit is placed on a smooth, hard surface. Never operate the unit while it is sitting on a surface such as a rug or carpet, since airflow will be restricted and inadequate for proper cooling.

It is normal for the TNT-200 to run warm to the touch at idle. If the unit is operated at high output levels for very extended periods of time, you may wish to use an auxillary cooling fan. Under normal operating conditions, a cooling fan is not necessary.

BREAK-IN

The TNT-200 power amplifier will require several hours of initial playing time to reach its full sonic potential. This is a normal function of the "healing" time of new capacitors. After this initial break-in period, the amplifier will reach its full sonic potential after turn-on (after stable operating temperatures and voltages have been reached.)

CONNECTION

The TNT-200 rear panel input jacks are located on the lower left and upper right of the amplifier chassis. Left and right are identified by a red (right) and black (left) washer under each input jack. Directly above/below each input jack are a pair of 5-way binding post output jacks, identified + (red) and - (black).

Connect the amplifier to the preamplifier using only the highest quality audio interconnect cables (RCA phono to RCA phono). Make sure there is a good tight fit of the ground shield over the input jack. (High quality interconnects will play a major role in the sonic performance achieved - consult your dealer for recommendations.)

Connect the speakers to the amplifier using the best available speaker wires. Take care to observe polarity, i.e.: RED binding post to speaker + terminal. BLACK binding post to speaker - terminal. It is extremely important that a good, solid connection be made. Use either a high quality banana plug or spade lug, and make sure there is a good tight fit.

CAUTION: THE TNT-200 AMPLIFIER "FLOATS" THE CHASSIS WITH RESPECT TO THE AUDIO GROUNDS. FOR THIS REASON, IF THE SPEAKER CABLES WERE TO TOUCH ANY POINT ON THE CHASSIS WHILE CONNECTED TO THE OUTPUT TERMINALS WHILE THE AMPLIFIER IS PLAYING, THE AMPLIFIER MAY STOP OPERATING, OR HUM, OR DEVELOP SOME OTHER FORM OF MALFUNCTION. IT IS THEREFORE VERY IMPORTANT TO USE SPEAKER CABLES THAT ARE INSULATED AT ALL POINTS OTHER THAN AT THE TIP (SPADE OR BANANA).

It is recommended that you always turn the power amplifier on AFTER the preamplifier has been turned on and has stabilized, to prevent possible damage to loudspeakers caused by preamp turn-on transients. It follows from this, of course, that the power amp also be turned-off BEFORE the preamp.

Connect the AC line cord to the AC power outlet in your home, or to an accessory outlet with a 750 watt capability. Turn the front panel power switch on - a green indicator should light.

DESIGN THEORY

Your Acoustat TNT-200 power amplifier owes much of its exceptional performance to the use of an innovative new output-stage topology never used in any audio amplifier ever sold. Other amplifier output stages are typically connected in one of two configurations, either as voltage followers or as a transconductance stage (which is common in tube amplifiers).

The follower type is particularly ill-adapted to the power MOSFET, the device used in the TNT-200 amplifier, as well as in other recent entries into the high performance solid-state power amplifier market. This voltage follower topology does not allow use of either full rail-to-rail dynamic range or (power) gain-bandwidth product. The second type of output connection is also not well suited to the power MOSFET since pure transconductance-mode operation of the output stage necessitates large amounts of "long-loop" (multi-stage) negative feedback.

Acoustat's ANISOTROPIC* output configuration is a third fundamental connection alternative, which is a pure TRANSresistance-NODal Voltage Amplifier - i.e. TRANS-NOVA stage. This output form achieves the best characteristics of the two established types, without their disadvantages. This stage has many fascinating properties such as:

* U.S. Pat. #4,467,288

- 1) Stage input voltages cause output currents.
- 2) Stage input currents cause output voltages.
- 3) Full (power) gain-bandwidth product is achieved.
- 4) Distortion, damping, phase and noise properties of a follower are preserved.
- 5) Full rail-to-rail dynamic range of the MOSFET's are used, with NO gate-enhancement loss.
- 6) "Gain" is described in OHMS in lieu of dB (approx. 4k Ohms here) 1 Ohm = 1 volt/1 amp. The output stage, into 8 ohms, shows about 500:1 current gain and 10:1 voltage gain for an aggregate power gain of 37 dB. This high output-stage power gain results in a circuit simplicity which directly improves sonic integrity.
- 7) Actual driver-stage speed is increased over a source-follower connection by a factor of ten for the same driver-stage power. This surprising result comes directly from the physics of capacitor-charging energy.

This new topology, synergized with the several-hundred-megahertz (power) gain-bandwidth product of the MOSFET's yields the incredible 0.6 microsecond rise time, 165 v/us slew-rate and 400K Hz bandwidth (-3 dB) of the TNT-200 power amplifier.

The second major innovation in the TNT-200 is facilitated by the TNT-200 circuit, and is called Complement Feedback*. This circuit invention "complements" or "perfects" the deficiencies of classic negative feedback (Black-1937) so amazingly that with only 20 dB of "loop-closure" feedback, the TNT-200 yields zero (nodal) output stage distortion and zero output impedance, resulting in a damping factor of over 1000:1.

This connection also completely eliminates any need for current-limit protection against load faults. In addition, the high-speed performance of this amplifier is achieved into complex loads without any sonically questionable choke (stability) "band-aids" applied to the output path. We submit that this is truly a state-of-the-art approach to amplifier design, and further, that surviving amplifier designs of the future will follow this pure field-effect route. The speed-toughness-linearity product of the MOSFET is not even remotely attainable in bipolar devices, or in any practical application of tube technology. Best of all, the amazing technical claims are highly correlated to real-world sonic improvements, improvements that you will hear even upon first listening to your new Acoustat TRANS-NOVA Twin-200 power amplifier.

ADJUSTMENTS

The Acoustat Trans-Nova amplifier has been fully adjusted and tested at the factory for maximum performance. For this reason it is strongly recommended that the following adjustments NOT be performed other than by a qualified technician at time of servicing.

BIAS ADJUSTMENT: The quiescent (idling) current of the TNT-200 amplifier is carefully set at the factory and should require re-adjustment only when repairs or circuit component changes are made.

Acoustat does not recommend increasing the bias above the factory setting of 300ma. This will cause the amplifier to run hotter than normal, with no sonic improvement.

The procedure for setting the bias is as follows:

1. Disconnect AC power, all signal inputs and output loads (speakers) from the amplifier.
2. Remove the top and bottom covers.
3. Each channel of the amp has a large (mother) and small (slave) PC board. Remove the fuse from the large PC board.
4. Connect the alligator clip leads of an ammeter (digital or other type with good accuracy), in place of the fuse. (Note: the negative lead from the meter should be connected to the fuse clip nearest the black heavy gauge wire, for correct polarity.)
5. Apply AC power. Adjust the trimmer potentiometer (marked "bias" on the foil side of the PC board), for a meter reading of 300 ma.
6. After a few minutes warm-up, the meter reading may change slightly. Re-adjust, if necessary.
7. Remove AC power and re-insert the fuse. Repeat the procedure for the other channel of the amplifier.

DC OFFSET ADJUSTMENT: This is also an adjustment which is carefully set by factory technicians, and should not require re-adjustment.

To check DC offset of the TNT-200:

1. Remove all input signal and output connections from the amplifier. Apply AC power.
2. Connect a DC voltmeter (digital is recommended), across the red and black binding posts on one channel. A reading of 0 volts \pm 50mv is normal.
3. If an adjustment is necessary, locate the trimmer potentiometer near the center of the large (mother) PC board. (This control is mounted in an "offset" position, when compared with other square parts on the board, and is marked "DC off." on the foil side of the PC board.)
4. Slowly change the control setting until a 0 volt \pm 50mv reading is obtained.
5. Repeat the procedure for the other channel.

SERVICE INFORMATION

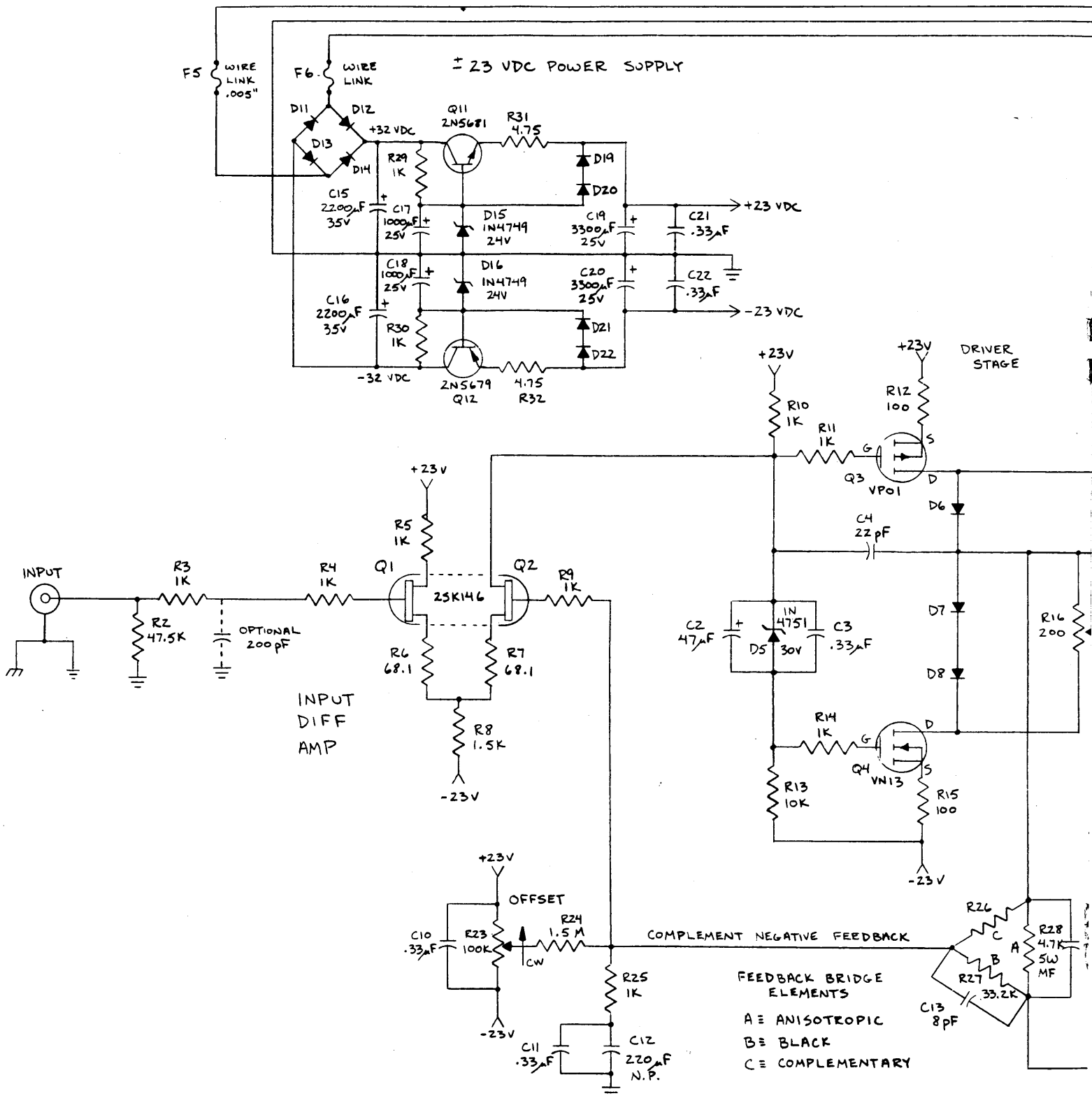
The Acoustat Trans-Nova Twin 200 amplifier is designed to provide years of trouble-free use.

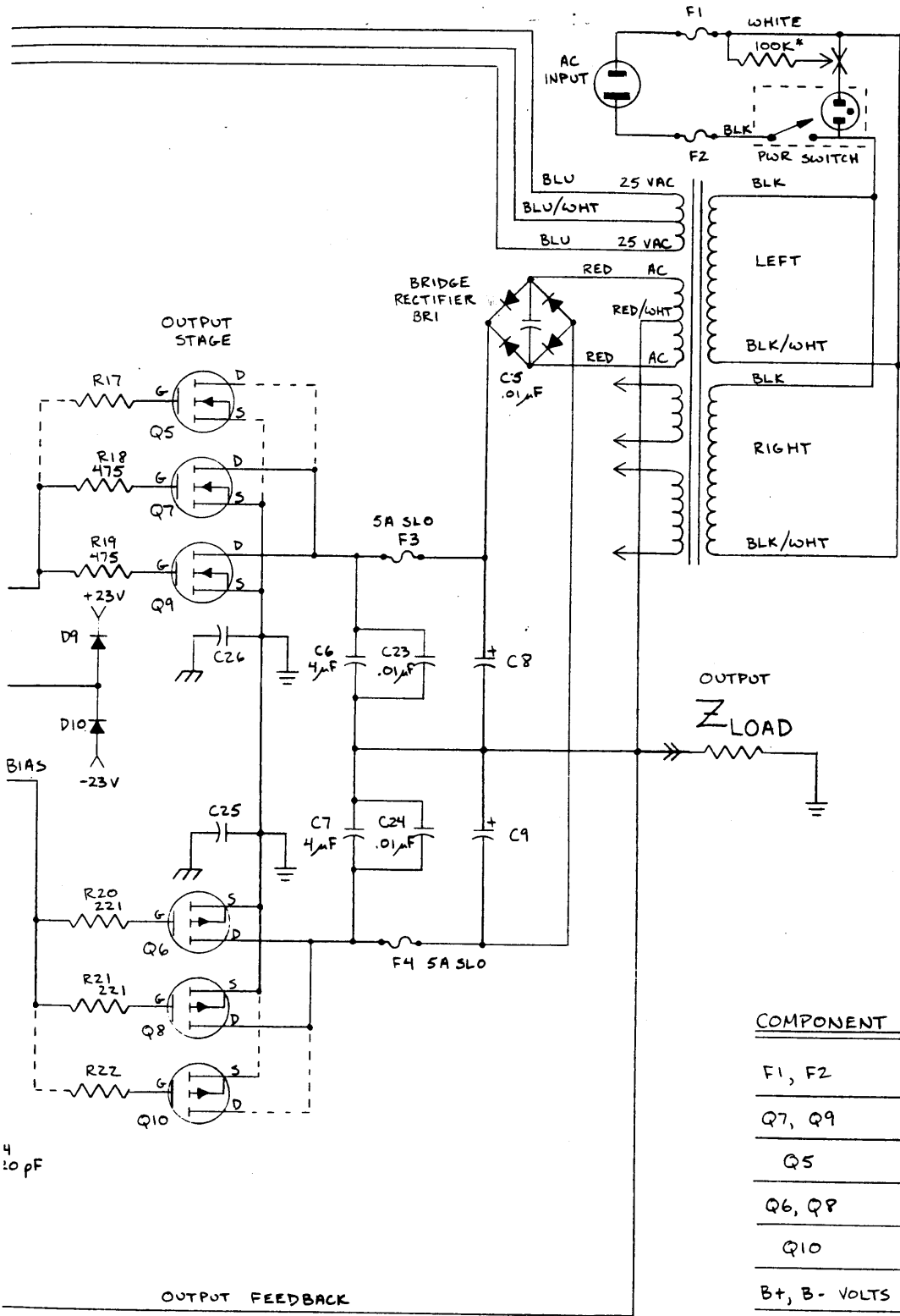
If distorted, weak or no sound is heard first check all connections to the amplifier's inputs and outputs. Try switching the input and output cables of one channel with that of the other channel.

Once you are sure the problem originates within the amplifier, disconnect AC power and remove the top and bottom covers. Check all six fuses within the TNT-200 amplifier. We have found that a visual inspection of these fuses is hardly accurate, and recommend that each fuse be checked with an ohmeter.

Note: There are two 7½ amp slo-blo AC line fuses located on the amplifier's center rail. There is one 5 amp slo-blo fuse on each PC board (TWO per channel).

IF ALL FUSES ARE FOUND TO BE INTACT — CALL ACOUSTAT SERVICE AT 305/462-6700.





* 220-240 VAC ONLY

UNLESS SPECIFIED OTHERWISE:
 - ALL DIODES 1N4006
 - ALL RESISTORS 1/2 WATT METAL FILM

⏏ CHASSIS GROUND
 ⊥ CIRCUIT GROUND

U.S. PAT. # 4,467,288

COMPONENT	TNT-120	TNT-200
F1, F2	5A SLO	7.5A SLO
Q7, Q9	2SK134	2SK135
Q5	NA	2SK135
Q6, Q8	2SJ49	2SJ50
Q10	NA	2SJ50
B+, B- VOLTS	~ ± 60 VDC	~ ± 70 VDC
C8, C9	15,000µF 63V	20,000µF 75V
C25, C26	NA	.01µF 50V
R22	NA	221Ω
R17	NA	475Ω
R26	150KΩ	316KΩ

NA = NOT APPLICABLE

4
10pF

OUTPUT FEEDBACK

CLEANING

The stainless steel faceplate and chassis of your new amplifier can be easily cleaned with any commercial stainless steel polish. To help prevent against fingerprints, we have found some spray-on furniture polishes (such as Pledge) will coat the faceplate with a clear film that resists fingerprinting.

RACK-MOUNTING

If you wish to rack-mount your amplifier, an adaptor bracket kit is available from your dealer at a small charge. This bracket is mounted in place of the two end-caps on the front corners of the amplifier. Complete instructions are included with the RM kit.

LIMITED WARRANTY FOR ACOUSTAT TNT-200 AMPLIFIER

ACOUSTAT warrants to the owner that the ACOUSTAT amplifier will perform as specified and that it will be free of defects in materials and workmanship for a period of FIVE YEARS from the date of original purchase.

ACOUSTAT will repair defective units without charge for labor or parts, subject to the following conditions:

- a) The unit must not have been altered or damaged through misuse, abuse, negligence, accident, or improper operation.
- b) The purchaser must provide the dealer's original dated bill of sale as proof of purchase; if unavailable, warranty period will be based on date of manufacture.
- c) All repairs must be undertaken at the factory or other service center designated by ACOUSTAT. Units submitted for warranty repairs must be shipped in the factory packing carton to ACOUSTAT or its designated service center, freight and insurance prepaid by the owner, and will be returned to the owner freight and insurance prepaid by ACOUSTAT.
- d) Normal wear and maintenance are not covered by this warranty.

ACOUSTAT SHALL NOT BE RESPONSIBLE IN ANY WAY FOR CONSEQUENTIAL OR INDIRECT DAMAGES OR LIABILITIES RESULTING FROM THE USE AND OPERATION OF THE PRODUCT COVERED HEREIN OR RESULTING FROM ANY BREACH OF THIS WARRANTY OR ANY IMPLIED WARRANTY RELATING TO THE SAID PRODUCT.

Some states do not allow exclusion or limitation of incidental or consequential damages so the above limitation or exclusion may not apply to you.

This warranty gives you specific legal rights and you may have other rights which vary from state to state.

SPECIFICATIONS

Power Output: 200 watts per channel into 8 ohms, both channels driven, from 20 to 20K Hz, at no more than .1% total harmonic distortion.

4 Ohm Power Output: 325 watts per channel, as above.

IM Distortion: No more than .1% at any output power from .01 watts to 200 watts.

Damping Factor: Greater than 1000 at all frequencies below 1000 Hz. Greater than 100 at 20K Hz.

Slew Rate: 165 v/us

Power Response: 20 Hz to 20K Hz ± 0.1 dB at 200 watts/channel, +0, -3 dB from 2.0 Hz to 400K Hz.

Feedback Closure Ratio: 20 dB

Complement Feedback Ratio: 0.5 dB

Input Impedance: 47k ohms

Input Sensitivity: 1.4 volts for rated output

Forward Driven Output Impedance: ZERO to 1K Hz

40 milliohm @ 20K Hz

200 milliohm @ 50K Hz

Power Consumption: 100 watts @ idle.

750 watts @ full rated power output.

PARTS LIST (Refer to Schematic)

RESISTORS:

(resistors are ½ watt, metal film 1% tolerance, except where noted)

R31, R32 = 4.75 ohm
R3, R4, R5, R9, R10, R14, R25, R29, R30 = 1 k ohm
R12, R15 = 100 ohm
R6, R7 = 68.1 ohm
R8 = 1.5 k ohm
R13 = 10 k ohm
R16 = 200 ohm trimmer potentiometer
R17, R18, R19 = 475 ohm
R20, R21, R22 = 221 ohm
R23 = 100 k ohm trimmer potentiometer
R24 = 1.5 m ohm
R26 = see schematic
R27 = 33.2 k ohm
R28 = 4.7 k ohm 3 watt metal oxide film

CAPACITORS:

C25, C26 = .1 uF 50v ceramic disc
C2 = 47 uF 35v low leakage lytic
C3, C10, C11, C21, C22 = .33 uF 160v polypropylene
C4 = 22 pF polystyrene
C5 = .01 uF 600v ceramic disc
C6, C7 = see schematic
C12 = 220 uF 25v non-polar lytic
C13 = 8 pF polystyrene
C14 = 620 pF polystyrene
C15, C16 = 2200 uF 35v lytic
C17, C18 = 1000 uF 25v lytic
C19, C20 = 3300 uF 25v lytic
C23, C24 = .01 uF 160v polystyrene

SEMICONDUCTORS:

Q1, Q2 = 2SK146 Toshiba
Q3 = VP01 (TO-5) (40-90v Supertex)
Q4 = VN13 (TO-5) (40-90v Supertex)
Q5, Q7, Q9 = Hitachi, see schematic
Q6, Q8, Q10 = Hitachi, see schematic
BR1 = 25 Amp 250v bridge rectifier
D5 = 1N4751A 30v Zener
D6 - D14, D19 - D22 = 1N4006
D15, D16 = 1N4749A 24v Zener
Q11 = 2N5681
Q12 = 2N5679

FUSES:

F1, F2 = see schematic
F3, F4 = 5 Amp Slo-Blo

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