

ACOUSTAT
corporation

TRANS-NOVA[®] PREAMPLIFIER
OWNER'S MANUAL

INTRODUCTION

Congratulations on your purchase of the Acoustat Trans-Nova Preamplifier, the most innovative NEW technology in audio amplification devices and low-level gain stages with equalization. With proper installation, connection and use, your new preamplifier should provide many years of trouble free music enjoyment. Since many aspects of the initial hook-up will determine the units overall performance, we strongly suggest you read over this manual completely to familiarize yourself with the unit before placing it in service.

WARRANTY STATEMENT

A limited five year warranty from date of purchase is provided by Acoustat Corporation on the Trans-Nova preamplifier. This applies to the original purchaser only. However, because Acoustat Corporation 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 date of original manufacture. This warranty is subject to the conditions and limitations stated within the documents on page 12 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 Corporation to inform you of any possible updates to the Preamp, as well as provide any new product news that might be of interest to you. This warranty card also aids Acoustat Corporation in its efforts to bring finer 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

NEVER PUSH THE REAR PANEL GAIN LEVEL SWITCH WITH THE VOLUME UP. This will cause a severe DC transient that could result in speaker or amplifier damage. Adjust phono gain switch ONLY when volume control is COMPLETELY DOWN.

PACKAGING

SAVE ALL PACKING MATERIALS. Your Acoustat preamplifier 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 packing materials can be obtained from Acoustat Corporation 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 be provided above and below the unit. The special feet used on the preamplifier 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 Trans-Nova Preamp to run warm to the touch.

In addition, it is important to avoid placing the Preamp too close to other electronic equipment, such as power amplifier, tuner, etc. Even though the Trans-Nova Preamp has been designed with excellent RF and hum immunity, the large magnetic fields that many electronic devices emit can cause a severe reduction in the preamplifier's signal to noise ratio. Although some installations will not exhibit this problem, it is important to keep the above in mind when making placement decisions. Remember, the TNP has SUBSTANTIAL gain (More than twice as much as a 200 watt amplifier) and it is amplifying VERY low-level signals. For this reason, the placement of the unit with respect to other audio or video components and the routing of low-level signal cables will determine the final outcome of the preamplifier's phono signal to noise. (NOTE: The left rear corner of the preamp – nearest to the phono inputs – is the area that is most sensitive to the above problems)

BREAK-IN

The Trans-Nova Preamp 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. Expect dramatic sonic improvements over the first few days of use.

CONNECTION

See rear panel Figure 1.

- 1) **AC Cord:** Plug Preamp into a wall outlet that will remain on at all times. Avoid switched outlets if at all possible.
- 2) **AC Convenience Outlets:** Two outlets have been provided for plugging in other audio equipment, such as tuner, tape decks, turntable, etc. The maximum wattage allowed on each outlet is 200 watts. Consult owner's manual for any equipment you plan to plug in here, to assure the wattage draw does not exceed the 400 watts total for the two outlets. These outlets are always "hot".
- 3) **Main Outputs:** Two front panel switchable preamp outputs are provided, for driving up to two different stereo power amplifiers. Note that **upper** jacks on all inputs/outputs (except phono) are designated left channel.
NOTE: The final quality of the sound you obtain will be determined to some extent by the quality of the interconnect cables used. We strongly suggest you consult your dealer for their recommendation on high quality interconnecting cables.
- 4) **External Processor Loop:** A front panel switchable input/output loop has been provided for use with high quality noise reduction systems, equalizers, ambience re-creators, etc.
- 5) **Tape Deck Input/Output:** Two complete tape deck record/play facilities with dubbing in both directions have been provided on the Trans-Nova preamp. The "out" jacks should be connected to the input, or "record" jacks of your tape recorder, and the "in" jacks should be connected to the output, or "play" jacks of the tape unit-for each of the two tape decks used in the system.

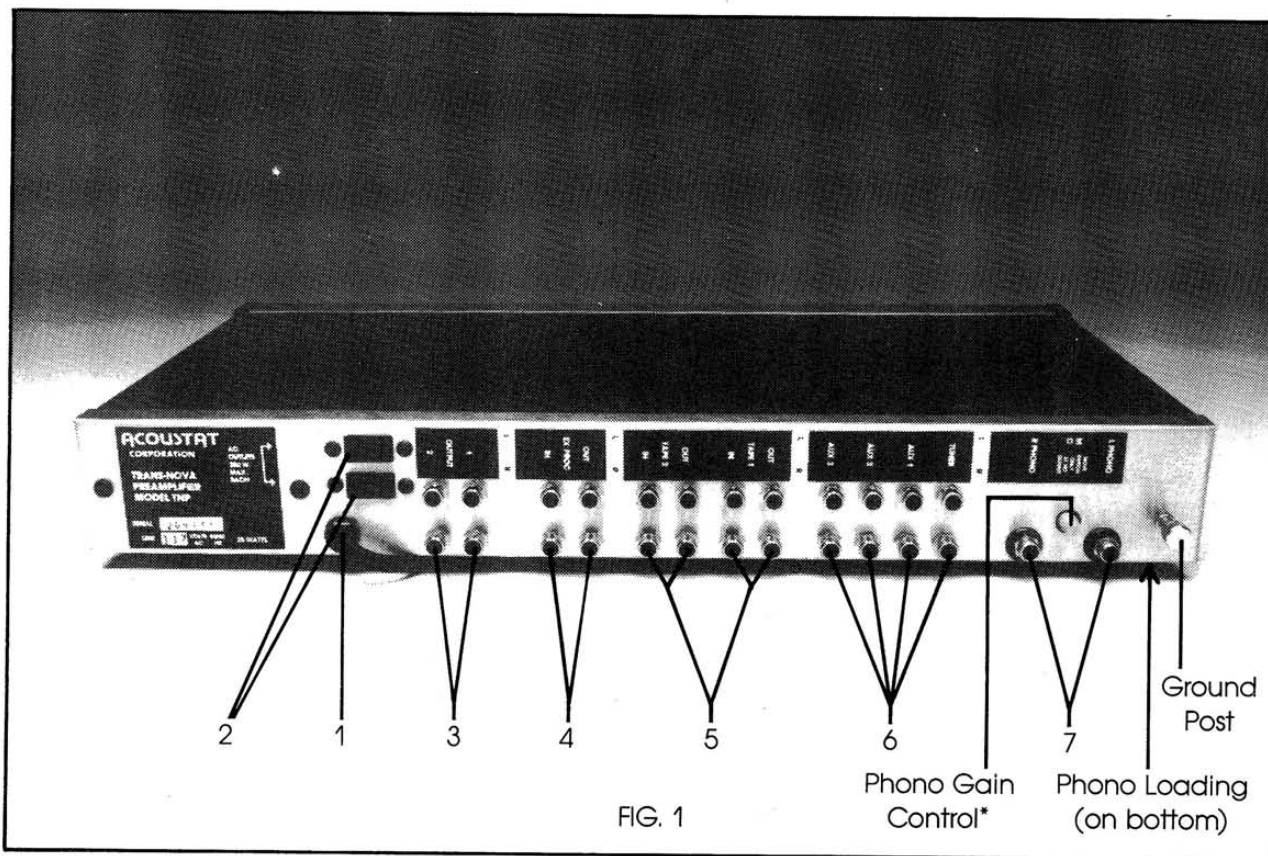


FIG. 1

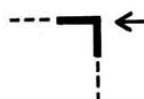
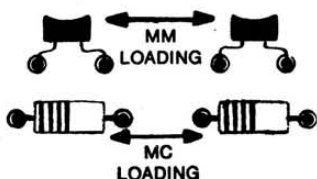
- 6) **High Level Inputs:** Your Preamp has facilities for four high level sources. In addition to an AM/FM Tuner, such equipment as TV tuners, VCR's etc can be used in the three auxillary inputs.
- 7) **PHONO INPUT:** The Trans-Nova employs a unitary phono stage capable of amplifying the very lowest output moving-coil cartridge's signal. In the case where a higher output moving-coil or moving magnet cartridge is to be used, the gain can be reduced to proper levels by depressing the gain switch* so that it is in the out position. By so doing, the gain is reduced by 20 dB, the load resistors installed (See below) will be out of circuit, and the green LED MC indicator will go out.
- *CAUTION: NEVER DEPRESS THE PHONO GAIN LEVEL SWITCH WITH THE VOLUME CONTROL UP. ALWAYS REDUCE VOLUME TO ZERO BEFORE DEPRESSING THIS REAR PANEL SWITCH.

(A) **MOVING COIL CARTRIDGE LOADING:** With the preamp in the high-gain (MC) position, the user has the ability to "load" the preamp phono inputs to best match the MC cartridge used. PLEASE NOTE: Although many MC cartridges will work quite well into the standard 47K input impedance, many others will NOT, and will require the installation of appropriate load resistors (described below) to obtain proper tonal balance. To Install the Load Resistors:

- 1) Remove the small access cover plate located on the bottom rear of the preamp, close to the phono inputs. (Use the hex-key wrench supplied to loosen the two screws, and then rotate the plate towards the front of the preamp.)
- 2) This will expose two sets of four (4) berrillium "amp" pins. Note the diagram on the bottom cover † that indicates which holes are for the resistors, identified in the diagram as "MC LOADING". These two sets of two (2) pin jacks are wider spaced as compared to the jacks for the MM capacitor loading (Described on page 4).

† See diagram on next page.

+Loading Diagram



Right-Rear corner of Preamp when viewed from bottom.

- 3) Simply plug in the appropriate value resistor, no soldering is required. The resistors have had their leads pre-bent to the proper size for easy installation. (The sockets will grip the resistor leads quite firmly.)
- 4) **Choosing The Proper Value Resistor.** Most MC cartridges come with specific load requirements indicated in the specifications sheet provided by the manufacturer. However, the proper choice may well depend on other aspects of the sound system, so some experimentation will most likely be necessary to obtain the tonal balance and sound quality you prefer. A general rule of thumb is to match the internal resistance of the MC cartridge, as indicated in the manufacturer's specifications. (This approach will probably get you in the right RANGE, but may not be the final choice of load resistor value.)
- 5) Values Included With Your New TNP:

47K Ohm	value when NO resistors are installed. This is the value from the factory.
4.75 Ohm	yellow/violet/green/silver/brown
15.0 Ohm	brown/green/black/gold/brown
33.2 Ohm	orange/orange/red/gold/brown
46.4 Ohm	yellow/blue/yellow/gold/brown
100.0 Ohm	brown/black/black/black/brown
221.0 Ohm	red/red/brown/black/brown

All of the resistors included are 1% tolerance metal film type. Other values are available at no-charge from Acoustat, if the above values are not appropriate. (Our experience indicates the above values will suffice 95% of the time.)

- 6) **PLEASE NOTE:** The MC loading resistors are only in circuit when the phono-gain switch is in the IN position (lighting the front panel LED MC indicator). In the low gain setting, the standard 47K Ohm load is presented to the MM cartridge.
- (B) MOVING MAGNET CARTRIDGE LOADING:** With the preamp phono gain switch in the OUT position, the user has the option to "load" the cartridge with additional capacitance. Many (or most) MM cartridges require some capacitance for proper high-frequency performance. Un-loaded, these cartridges may sound "bright". Again, consult the manufacturer's specifications for the recommended load capacitance, specified in pf (pico-farads) on the cartridge spec sheet. The total capacitance "seen" by the MM cartridge will be the total of: tonearm cable capacitance + tonearm internal wiring capacitance + phono preamp input capacitance. You will need to consult the spec sheet for the tonearm to determine the first two variables. The input capacitance on the TNP is essentially 0 pf as it comes from the factory. Your new preamp comes with two 200 pf silver-mica-capacitors to provide additional capacitance if required.
- To install these capacitors:
- 1) Open the access cover-plate on the bottom of the preamp — See section 7 (A) – 1 of this manual.
 - 2) Note diagram adjacent to the access plate for proper location of capacitors. Note that the two sets of two (2) "amp" pins for the capacitors have narrower spacing than the pins for the MC load resistors. These holes are located closer to the rear of the preamp than the wide-spaced sets for MC load resistors.
 - 3) Simply plug-in the small capacitors into the appropriate holes. Again, no soldering is necessary, the connectors will firmly grip the capacitor leads.

NOTE: It is typically not necessary to exactly match the recommended load capacitance of the MM cartridge. In most cases, the 200 pf capacitor, in addition to the tonearm total capacitance, will yield an acceptable value. If lower or higher value caps are desired, they can be obtained from Acoustat Corp. at no-charge. (Also, most electronics supply houses will have suitable alternative values "on the shelf", so that you can obtain different capacitor values locally.)

REMEMBER: When the phono gain switch is in the out (low-gain) position, the load RESISTORS are out of circuit, and the load CAPACITORS are in circuit.

FRONT PANEL OPERATION

See front panel Figure 2.

- 1) **Moving-Coil Indicator LED:** The indicator LED will light when the preamp is in the phono mode, high-gain position, i.e.; when the rear panel high-gain switch is the "IN" position. (Remember, when the LED is illuminated, the plug in load **resistors** are IN circuit; when the LED is not lit, the plug in load **capacitors** are IN circuit.)
- 2) **SOURCE Inputs:** The TNP has facilities for one phono system and up to 4 high level sources (tuner, VCR, Videodisc, Compact disc). Only ONE source button may be depressed at a time, and the depressed button will correspond to the appropriate rear-panel input jacks.
- 3) **Tape Copy:** The COPY buttons allow the user to tape BETWEEN two tape decks plugged into the two tape monitor input/output loops. The first COPY button allows recordings on tape deck #2 (tape deck plugged into TAPE MONITOR 2 input/output jacks) to be copied onto tape deck #1 (the tape deck that is plugged in to TAPE MONITOR 1 input/output jacks). The second COPY button allows copies to be made from tape deck #1 to tape deck #2.

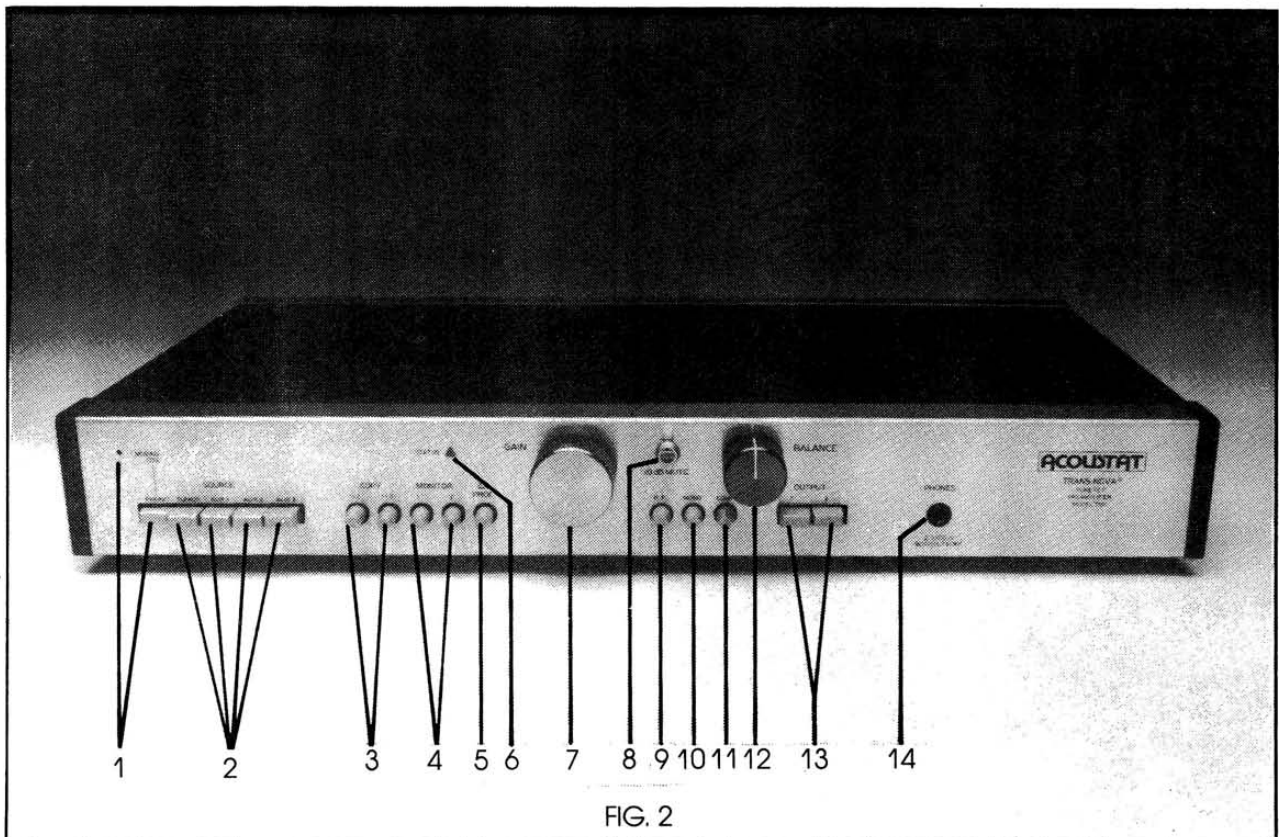


FIG. 2

In addition, the tape COPY buttons perform another important function, that is, assuring total isolation of the main signal path from any tape decks plugged into the tape monitor loops. For this reason, it is recommended that when a tape deck is not in use, one of the tape COPY buttons be depressed.

However, when a tape COPY button is depressed, NO SOURCE SIGNAL IS FED TO EITHER TAPE MONITOR OUTPUT OR THE EXTERNAL PROCESSOR OUTPUT. Therefore, when making recording from any SOURCE, both tape COPY buttons must be in the "out" position. (To get both buttons out, simply depress the "out" COPY button half-way, which will cause both COPY buttons to pop into the "out" position.)

- 4) **Monitor:** When either tape MONITOR button is depressed, the playback signal from the appropriate deck will be fed to the main outputs, overriding any selected SOURCE signal. Both MONITOR buttons must be in the "out" position for listening to any SOURCE input.
- 5) **External Processor:** The TNP includes a third input/output loop, for use with equalizers, signal processors (such as ambience re-creators, noise reduction systems or dynamic range expanders), or any other accessory, requiring an input/output loop.

NOTE: FOR A MORE COMPLETE UNDERSTANDING OF THE TAPE MONITORING SWITCHING, REFER TO DIAGRAM 1 BELOW.

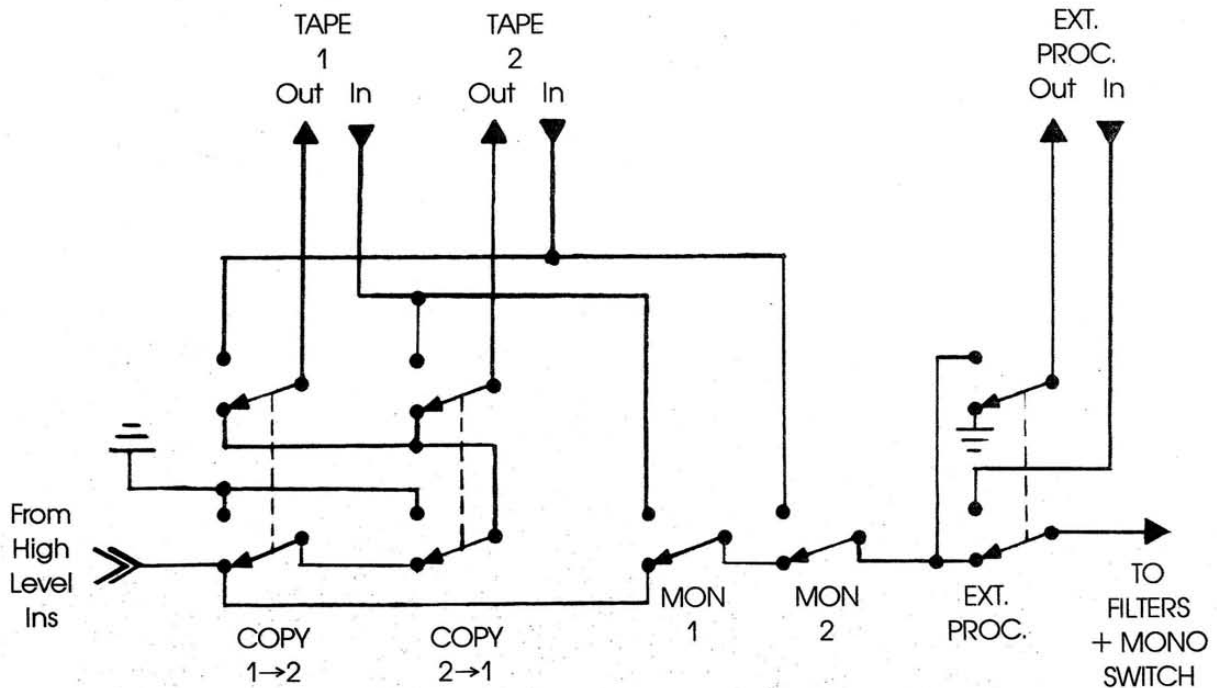


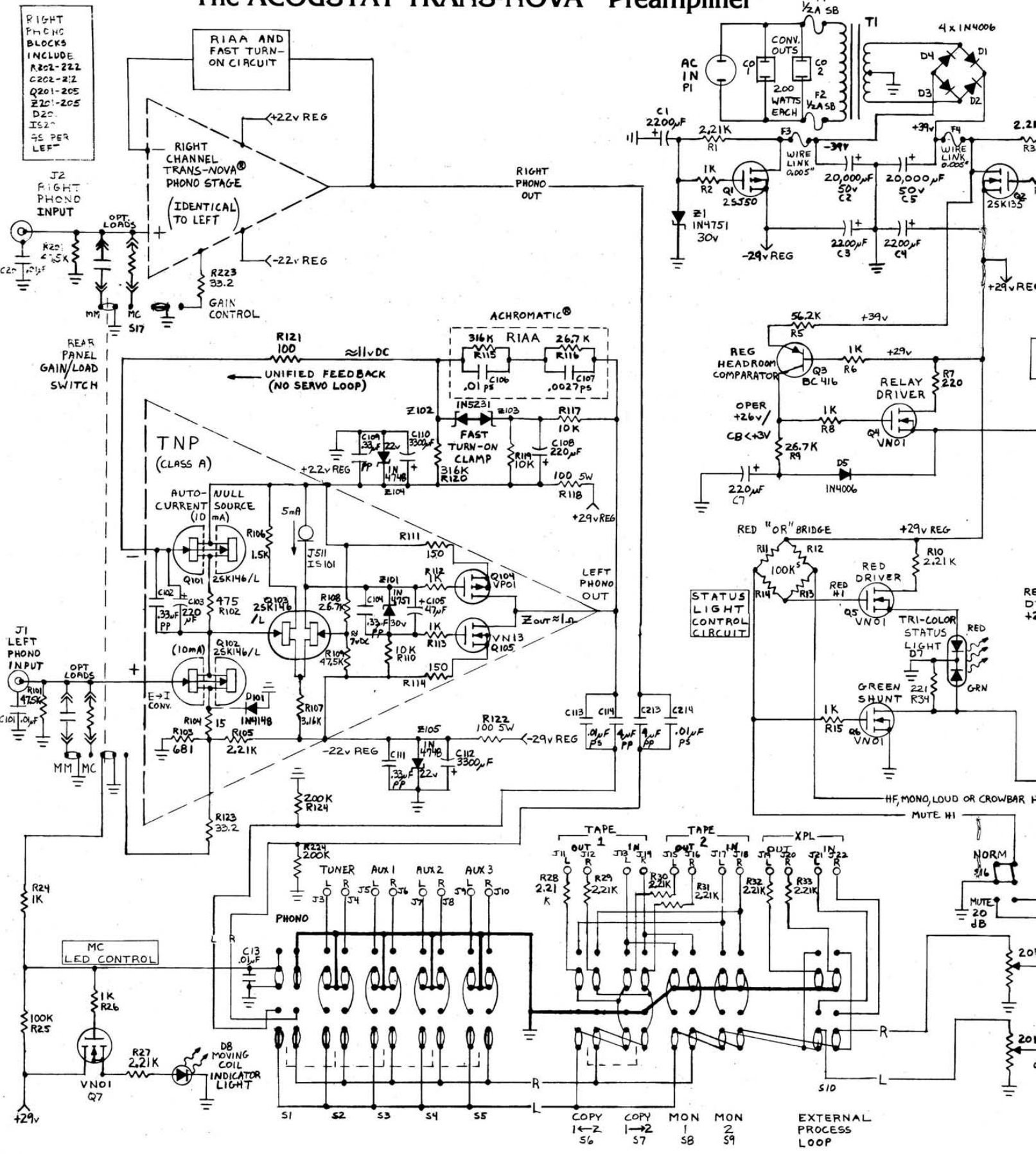
DIAGRAM 1
(One Channel Shown)

- 6) **Status Indicator:** This tri-color LED advises the user visually as to the "status" of the preamps main signal path. When the LED is GREEN, the signal path is uninterrupted by either filter (High Filter or Loudness Compensation, discussed in later sections, below), and the signal is in stereo. When the LED is AMBER, the signal path is no longer "pure", that is, one of the filters is "in", or the mono button has been depressed. When the LED is RED, this indicates that the 20 dB mute is activated. (See section 8, below.) RED overrides the AMBER indicator mode. **TURN-ON:** When the unit is first plugged-in, the Status indicator will display the unit charge-up cycle as follows:

When first plugged-in, the LED will be dark, within about 5 seconds the LED will turn RED. As the unit charges, the LED will gradually turn AMBER. Within 30 seconds the LED will turn GREEN with an audible "click", and the unit will then operate. NOTE: The above sequence will not take place IF the Mute switch is depressed, or IF either filter or the Mono button are depressed.

- 7) **Gain Control**: The TNP gain control is designed to have a slow taper, for maximum flexibility in gain (volume) setting. For this reason, you should expect to achieve full gain when the knob has been rotated to approximately the three o'clock position. (This will vary, of course, based on phono cartridge used and input sensitivity of the power amplifier.)
- 8) **20 dB Mute**: With the MUTE switch in the "down" position, the volume level to the main outputs is reduced by 20 dB. (This is a significant reduction, but signal will still be audible.) This function is most useful for record cueing, in that it allows the user to maintain a given volume level from record to record. When depressed, the STATUS indicator will glow RED. (See section 6, above.)
- 9) **High Filter**: When depressed, the HF button will roll-off ultra-high frequencies (above 15K Hz) at the rate of 6 dB per octave. This control is most useful on noisy FM or TV broadcasts, or on any source subject to RF interference. For critical listening to high-quality source material, this button should be left in the "out" position. This filter is entirely passive, and will therefore not significantly effect the sonic quality of the source in use. Note, however, the filter is active at very high frequencies, so its effects are subtle and often unnoticeable. When this HF button is depressed, the STATUS indicator will glow AMBER. (See section 6, above.)
- 10) **Mono**: When depressed, the Mono button will combine left and right inputs, and send this combined signal to the Main Outputs (NOT the Tape outputs). This control is especially useful with mono sources, allowing them to be played through both speakers in two speaker mono. When depressed, the STATUS indicator will glow AMBER. (See section 6, above.)
- 11) **Loudness Compensation**: The COMP button on the TNP is a unique passive circuit designed to enhance low level (background level) listening. When depressed, the volume level will drop significantly (due to a reduction in midrange level). Because of this passive reduction in middle frequencies, the frequency extremes, lows and highs, will now appear to be boosted in level. This compensation follows closely the theories of Fletcher and Munson, which are based on the fact that humans have reduced perceptions of low and high frequencies at very low volume levels. This control should be used to enhance low volume listening pleasure ONLY. Use of this function at higher volumes will require considerably more power from the power amplifier, possibly driving it into clipping distortion and possible speaker damage. When the COMP button is "in", the STATUS indicator will glow AMBER. (See section 6, above.)
- 12) **Balance**: The BALANCE control on the TNP is a unique ACTIVE balance. For this reason, when rotated fully left or right, the opposite channel will not be completely silent. This is a normal function of this type of balance circuit.
- 13) **Output Selector**: The TNP has facilities for using two power amplifiers, with front panel selection. Depressing either Output button, will feed the signal to the corresponding rear panel Main Output jacks. These buttons are self-exclusive in mechanical function (that is, if you push in Output 1, Output 2 will "pop" out), however, BOTH can be depressed simply by pushing both at once. This may be necessary for multiple room systems, or bi-amped systems. In addition, both Outputs can be shut-off by depressing either button halfway – causing BOTH buttons to be in the "out" position. This is necessary when using headphones with the preamplifier. (See section 14, below)
- 14) **Headphone Jack**: The TNP allows use of conventional stereo headphones through a front panel PHONES jack. In order to use this feature BOTH main OUTPUT buttons must be in the "out" position (See section 13 above), AND the headphones MUST HAVE AN IMPEDANCE GREATER THAN 100 OHMS.

The ACOUSTAT TRANS-NOVA® Preamplifier



RIGHT PHONO BLOCKS INCLUDE:
 R202-222
 C202-212
 Q201-205
 Z201-205
 D20
 IS27
 75 PER LEF

RIAA AND FAST TURN-ON CIRCUIT

RIGHT CHANNEL TRANS-NOVA® PHONO STAGE (IDENTICAL TO LEFT)

ACHROMATIC®

TNP (CLASS A)

AUTO-CURRENT (10 mA)

(10mA)

TAPE

TAPE

XPL

PHONO

OUT 1

OUT 2

OUT 3

IN 1

IN 2

IN 3

OUT 4

OUT 5

OUT 6

IN 4

IN 5

IN 6

OUT 7

OUT 8

OUT 9

IN 7

IN 8

IN 9

OUT 10

OUT 11

OUT 12

IN 10

IN 11

IN 12

OUT 13

OUT 14

OUT 15

IN 13

IN 14

IN 15

OUT 16

OUT 17

OUT 18

IN 16

IN 17

IN 18

OUT 19

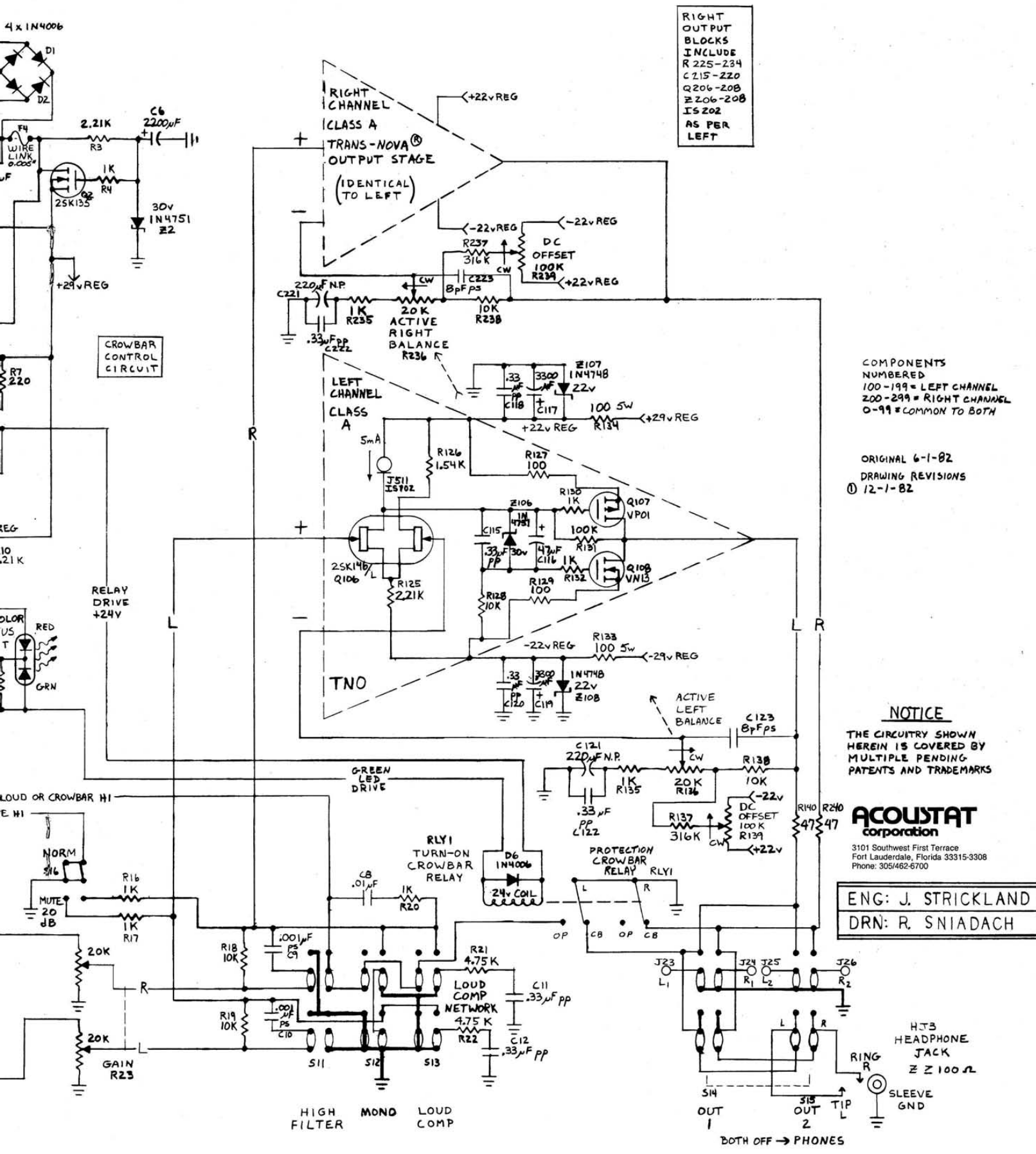
OUT 20

OUT 21

IN 19

IN 20

IN 21



RIGHT
OUTPUT
BLOCKS
INCLUDE
R 225-234
C 215-220
Q 206-208
Z 206-208
IS 202
AS PER
LEFT

COMPONENTS
NUMBERED
100-199 = LEFT CHANNEL
200-299 = RIGHT CHANNEL
0-99 = COMMON TO BOTH

ORIGINAL 6-1-82
DRAWING REVISIONS
① 12-1-82

NOTICE
THE CIRCUITRY SHOWN
HEREIN IS COVERED BY
MULTIPLE PENDING
PATENTS AND TRADEMARKS

ACOUSTAT
corporation
3101 Southwest First Terrace
Fort Lauderdale, Florida 33315-3308
Phone: 305/462-6700

ENG: J. STRICKLAND
DRN: R. SNIADACH

H3B
HEADPHONE
JACK
Z Z 100 Ω

BOTH OFF → PHONES

DESIGN THEORY

The Best of Both Worlds – Achromatic Equalization®*

The Trans-Nova phono stage represents a successful solution to one of the most complex technical challenges in the audio field that Acoustat has ever tackled – notwithstanding the highly acclaimed electrostatic loudspeaker systems, and power amplifier, innovations pioneered by Acoustat over the past 10 years. The design goals were: a truly superb unitary phono stage, equally at home on low and high-output cartridges; with negligible noise; wide bandpass; high overload; near perfect RIAA amplitude and phase reconstruction; first order DC centering; extremely low output impedance; no DC servo-loops – this was the challenge set forth!

A challenge like the above was not going to be met using EITHER of the time-honored methods of passive or active equalization circuits. The relative merits and demerits of these old methods are well known, and are shown below in Figures 3 and 4.

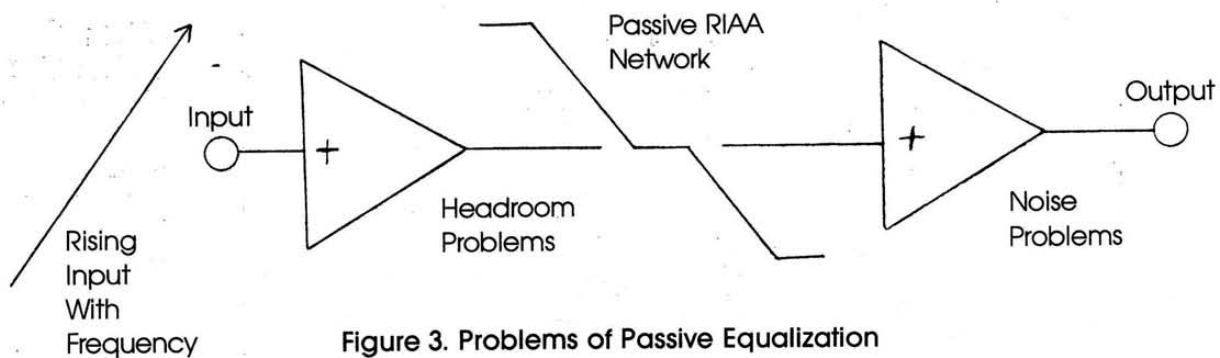


Figure 3. Problems of Passive Equalization

The passive approach is characterized by problems of first stage headroom and second stage noise, due to the 40 dB high-frequency insertion-loss of the passive network.

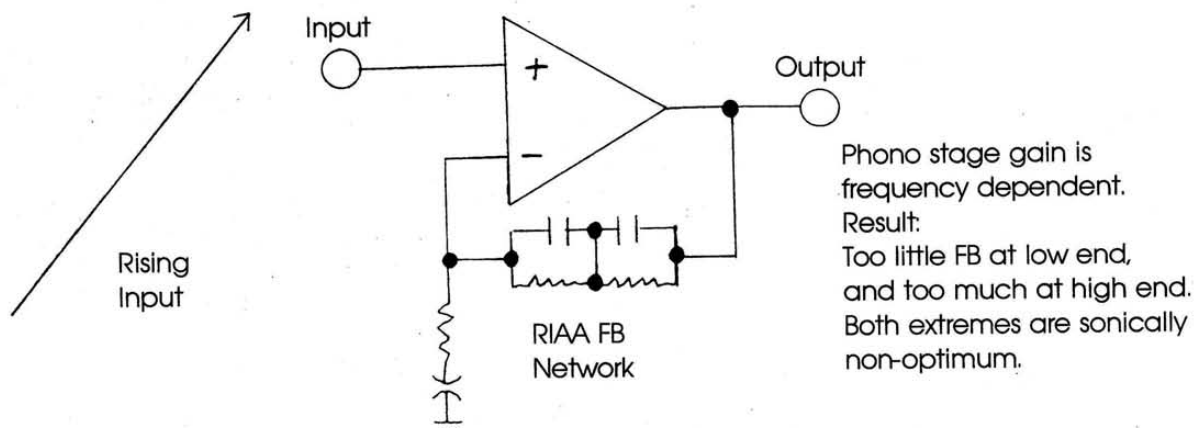


Figure 4. Problems of Active Equalization

*Patent & Trademarks Pending.

The much more commonly used active equalization stage provides solutions to the classic passive circuit problems, but comes with a whole set of its own problems. These difficulties arise out of the subtle ramifications of classic negative feedback theory. The RIAA characteristic requires the amplifier's closed-loop gain to change by a hundred-to-one ratio (40 dB) over the audio range. This means simply, too little feedback-closure at low frequencies and too much at high-frequencies. Too little causes inadequate suppression of simple distortions; too much causes generation of complex distortions (high order).

Acousta's new circuit, see Figure 5, has all the advantages of both old methods and the disadvantages of neither. The processing problem has been split into two parts – a forward propagating signal current and a back-propagating error voltage – thus disentangling the limitations of all past methods. This Achromatic Equalization®* technique is a derivative of the principle used in the highly regarded Trans-Nova power amplifier. Further required innovations created a new type of first stage able to act as a pure transconductance (voltage to current converter) for AC and as a current-balancing stage for DC.

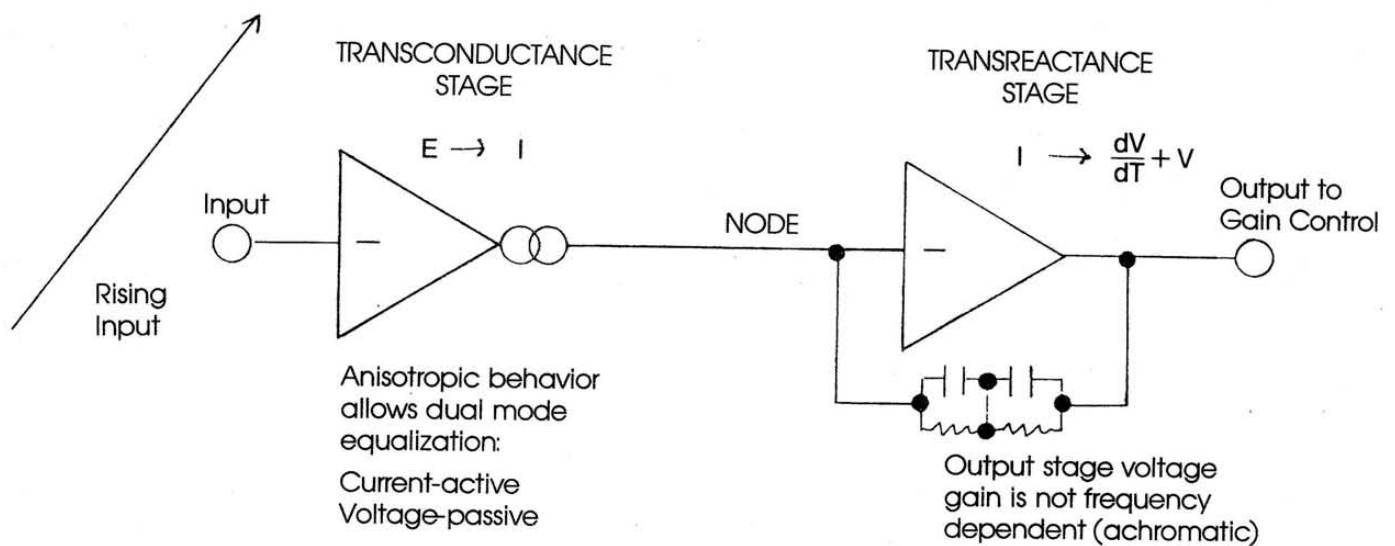


Figure 5. Anisotropic Phono Circuit

In this arrangement, feedback-closure-ratio does not change with frequency-but total throughput gain does! Also, virtually all latter-stage noise disappears. Output impedance is 1 ohm, with EQ stage open-loop and closed-loop gain being the same 75 dB!

Of course, what is really significant about this innovation is that the technical superiority claims do correlate to an unprecedented improvement in openness, and a freedom from past sonic problems.

CLEANING

The stainless steel faceplate and chassis of your new preamplifier can be easily cleaned with any commercial stainless 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.

*Patent & Trademarks Pending

RACK-MOUNTING

If you wish to rack-mount your preamplifier, an adaptor bracket kit is available from your dealer at a modest charge. This bracket is mounted in place of the two end-caps on the front corners of the preamp. Complete instructions are included with the RM-2 kit.

LIMITED WARRANTY FOR ACOUSTAT TNP PREAMPLIFIER

ACOUSTAT CORPORATION warrants to the owner that the ACOUSTAT preamplifier 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 CORPORATION 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 CORPORATION. Units submitted for warranty repairs must be shipped in the factory packing carton to ACOUSTAT CORPORATION 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 CORPORATION.
- d) Normal wear and maintenance are not covered by this warranty.

ACOUSTAT CORPORATION 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 of 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

Input Impedance: Phono: 47k, plug in loads available.

High Level: 20k, Tape In; 20k

Output Impedance: Main Outputs: 47 ohms, Tape Outputs: 2.2k ohms.

Gain Structure: Phono (high-gain) to tape out: 57 dB @ 1000 Kz. Phono (high-gain) to main out: 83 dB @ 1000 Hz. High Inputs to main out: 26 dB @ 1000 Hz.

Phono Overload: 240 millivolts @ 1000 Hz.

Frequency Response: Total preamp RIAA through-put: 3 Hz-350k Hz +0, -3 dB, High Level: 2 Hz-500k Hz +0, -3 dB.

Noise: 62 dB Moving-Coil Gain Level, reference to 200 microvolts-unweighted, 75 dB Moving-Magnet Gain Level, reference to 2.0 millivolt-unweighted.

Distortion: Less than .01% THD, total RIAA through-put.

Dimensions: 17½ "W x 2¼"H x 9"D

Net Weight: 12 lbs.

PARTS LIST (Refer to Schematic)

NOTE: Parts numbered 0-99 are power supply components, or are common to both channels. Parts numbered 100-199 are left channel only. Right channel parts are 201-299 and are "identical" to left channel parts listed below. For example, left channel part number 101 is equivalent to right channel part number 201, etc.

RESISTORS:

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

R1, R3, R10, R27, R28, R29, R30, R31, R32, R33, R105, R125 = 2.2 k

R2, R4, R6, R8, R15, R16, R17, R20, R24, R26, R112,

R113, R130, R132, R135 = 1k

R5 = 56.2k

R7, R34 = 221 ohm

R9, R108, R116, = 26.7k

R11, R12, R13, R14, R25, R131 = 100k

R18, R19, R110, R117, R119, R128, R138 = 10k

R21, R22 = 4.75k

R23 = Volume pot 20k x 2 Acoustat #30341

R101, R109 = 47.5k

R102 = 475 ohm

R103 = 681 ohm

R104 = 15 ohm

R106, R126 = 1.5k

R107 = 3.16k

R111, R114 = 150 ohm

R115, R120, R137 = 316k

R118, R122, R133, R134 = 100 ohm 3w

R121, R127, R129 = 100 ohm

R123 = 33.2 ohm

R124 = 200k

R136 = Balance pot 20k x 2 Acoustat #30342

R139 = 100k trimpot

R140 = 47 ohm

CAPACITORS

C1, C3, C4, C6 = 2200uf 35v lytic

C2, C5 = 20,000uf 50v computer grade lytic, Acoustat #30363

C7, C103, C108 = 220uf 25v lytic

C8, C106, C113 = .01 polystyrene

C9, C10 = .001 polystyrene

C11, C12, C102, C104, C109, C111, C115, C118,

C120, C122 = .33uf polypropelene

C13, C101 = .01 50v ceramic

C105, C116 = 47uf 35v low leakage lytic

C107 = .0027 polystyrene

C110, C112, C117, C119 = 3300uf 25v lytic

C114 = 4uf polypropelene

C121 = 220uf 25v Non-Polar lytic

C123 = 8pf polystyrene

ACOUSTAT
corporation

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