THAEDRA

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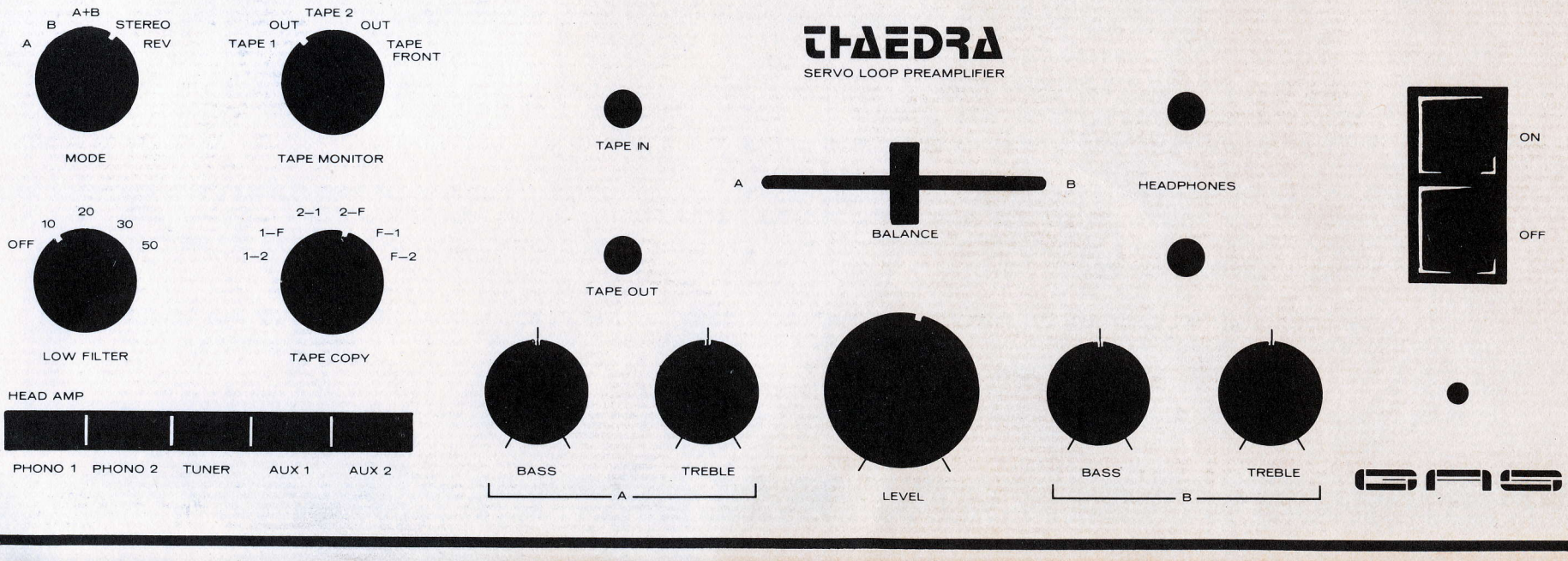
OWNER'S MANUAL



INTRODUCTION

Your THAEDRA Servo-loop Preamplifier is the electronic equivalent of a magnificent musical instrument. It contains the most exotic and elegant circuits ever used for audio-frequency signal processing. These circuits, composed of the finest electronic components available, are surrounded by a rugged, all-steel chassis. When properly installed, and used only with the very best associated equipment, we are certain that your THAEDRA will give you years of sonic enjoyment.

THAEDRA is manufactured by the Great American Sound Company, a group of engineers and craftsmen who really *care* about the *art* of sound reproduction. We appreciate the vote of confidence that your selection of THAEDRA has given us.

WARRANTY

THIS PRODUCT IS WARRANTED UNDER THE FOLLOWING CONDITIONS:

1. PRODUCT IS PURCHASED THROUGH AN AUTHORIZED G.A.S. CO., INC. DEALER.

2. WARRANTY COVERS NORMAL OPERATING CONDITIONS OF HOME USE.

3. WARRANTY PERIOD BEGINS AS OF DATE OF SALE PROVIDED THIS CARD IS FILLED OUT AND REGISTERED BY THE AUTHORIZED G.A.S. DEALER WHERE THE PRODUCT WAS PURCHASED. REGISTRY PERIOD IS 20 DAYS.

4. DELIBERATE MISUSE, MISHANDLING, FAILURE TO REPORT RECEIVING DAMAGED MERCHANDISE, OR UNAUTHORIZED TAMPERING OR MODIFYING TO THIS MERCHANDISE AUTOMATICALLY VOIDS ALL WARRANTIES.

5. WARRANTY PERIOD FOR ALL G.A.S. CO., INC. FACTORY WIRED PRODUCTS IS 5 YEARS COVERING BOTH PARTS AND LABOR. TRANSPORTATION CHARGES TO AND FROM THE DEALER OR FACTORY ARE EXCLUDED.

6. WARRANTY ON ALL G.A.S. CO., INC. PRODUCTS USED IN ANY OTHER FASHION OTHER THAN STATED ABOVE SHALL REDUCE THE WARRANTY TIME PERIOD AND OTHER CONDITIONS TO NEGOTIATIONS BETWEEN G.A.S. CO., INC. AND PROSPECTIVE USER.

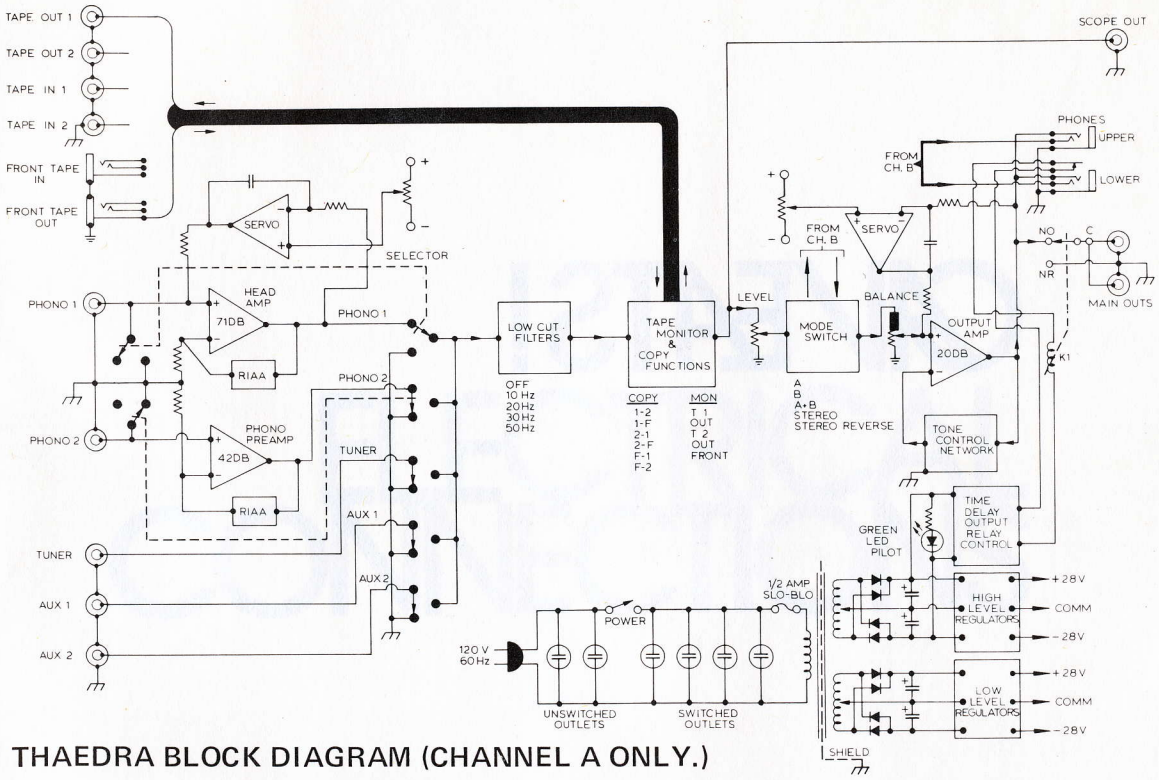
7. THIS WARRANTY SHALL EXTEND TO EACH SUCCESSIVE OWNER PROVIDED G.A.S. CO., INC. IS NOTIFIED BY REGISTERED MAIL WITHIN 20 DAYS OF RESALE BY INITIAL OR PRESENT OWNER. THIS NOTIFICATION SHALL CONSIST OF DATE OF SALE, AMOUNT, NAME AND ADDRESS OF NEW OWNER.

8. G.A.S. CO., INC. GUARANTEES THAT ALL G.A.S. CO., INC. PRODUCTS ARE FREE FROM DEFECTS IN MATERIALS AND/OR WORKMANSHIP FOR THE REQUIRED WARRANTY PERIOD. OWNERS OF G.A.S. CO., INC. PRODUCTS ARE ENTITLED TO FREE PERIODIC CHECKS, AT EITHER DEALER OR FACTORY LOCATIONS, TO INSURE PRODUCT PERFORMANCE TO ORIGINAL SPECIFICATIONS.

   G.A.S. CO., INC. WILL REPAIR OR REPLACE ANY AND ALL DEFECTIVE PARTS AT NO CHARGE, PROVIDED ALL OTHER CONDITIONS OF THE WARRANTY ARE IN ORDER. THIS FREE CHECKOUT SERVICE IS LIMITED TO A MAXIMUM OF ONCE A YEAR, PER UNIT, PER CUSTOMER.

9. THIS WARRANTY IS NOT VALID UNLESS ACCOMPANIED BY SALES SLIP VALIDATION OR PROPERLY STATED INVOICE (COPY).

OPERATIONAL THEORY



THAEDRA BLOCK DIAGRAM (CHANNEL A ONLY.)

THAEDRA has been a long time coming and its concepts are a radical departure from anything that has existed before. Mechanically and electrically, THAEDRA is unique:

From input to output, THAEDRA is 100 percent full-complementary, a concept originally conceived by G.A.S. Company engineers. As versatile as the unit is, there are only *two* stages of amplification. All other preamps use three or more stages which add to coloration and impair their ability to achieve a totally open, unrestricted sound quality.

All direct (D.C.) coupled amplifiers suffer from a problem known as d.c. drift. Accompanying this drift is low frequency modulation noise. Until now, the only way to eliminate drift was to use capacitor coupling or gigantic amounts of negative feedback; hardly elegant solutions. Enter the SERVO.

The concept of servo-control has found many applications but has never appeared in audio electronics. In THAEDRA, servo amplifiers (completely outside the audio stream) control absolutely all d.c. voltages. The result is that after the input coupling capacitors in the phono circuit, THAEDRA is *100 percent D.C. coupled* —— the only preamplifier in existence which is.

THAEDRA is unique: It has a truly low-noise Head Amp for use with low-output, moving-coil cartridges. It is a fact that the moving-coil cartridge traces in the same manner as the head in a disc cutter. Their ability to almost exactly reproduce the signal engraved on a vinyl groove is unparalleled. Unfortunately, up to now their very low outputs required the use of either a step-up transformer or a pre-preamp to achieve the necessary gain. The transformers have severe frequency-response limitations while the available pre-preamps suffer from noise and distortion. On top of this, both require the additional use of a phono preamp circuit, *adding* links in the audio chain which further degrade sound quality. THAEDRA'S single low-noise Head Amp circuit feeds the line-amplifier directly, using just two stages from input to output. The Head Amp is, of course, servo-controlled.

UNPACKING

Immediately upon receiving THAEDRA, inspect the carton for evidence of mishandling during shipment. Then, carefully unpack the preamplifier and inspect it for any sign of damage which might have occurred.

Please save the shipping carton and all the associated packing materials for later use, should the occasion arise requiring the subsequent movement of THAEDRA. The shipping materials have been carefully designed to transport your THAEDRA with a minimum of disturbance.

NOTE: In the event you discover some damage that has occurred in shipping, please contact your dealer *immediately.*

CAVEATS!

It must be remembered that THAEDRA is a complex, highly sophisticated example of electronic equipment and some common sense must be exercised when operating it.

The maximum output at clipping is greater than 10 Volts R.M.S.; This converts to an overload point of 3mV at the input, giving approximately 40dB of headroom *above* the standard operating level. This corresponds to an output level to a power amplifier (Assuming a 1.5V sensitivity for 200 Watts per channel) which would drive it to approximately *20,000 WATTS!*

Therefore, in order to protect your amplifier(s) and speakers, please observe the following precautions:

1. Don't turn on the unit with the HEAD AMP selected and the LEVEL up.
2. Turn down the LEVEL in between musical or source selections and when turning the power on or off.
3. Use shorting jacks in the *unused* PHONO 1 or PHONO 2 input jacks.
4. THAEDRA runs *warm!* Make sure it has adequate ventilation.
5. Because it is designed to run warm, THAEDRA should be allowed to warm up prior to any critical listening.

INSTALLATION

THAEDRA is designed primarily for mounting on a shelf. An optional, oiled teak wood cabinet is available with either natural or black-toned finish.

Where THAEDRA is to be inserted into a panel, a 16½ inch by 5¼ inch cutout must be provided. A supporting shelf, or rails must be used in addition, as the front panel is *not* designed to support the massive weight of the unit.

Allow enough space and/or holes for proper ventilation —— Under no circumstances should the ventilation slots on the top and bottom of the chassis be blocked.

RACK–MOUNTING: A black-anodized version of THAEDRA is available from your dealer, on special order, for use with the standard, 19 inch metal rack. Be certain that the insulating plastic bushings (provided with the panel) are used under each mounting screw to provide electrical isolation of the unit from the metal rack.

CAUTION: Under no circumstances should you mount the unit in a vertical position. This will cause overheating of the unit.

ELECTRICAL CONNECTIONS

With the power switch in the OFF position, plug the line cord into any 105–125V, 50 or 60Hz outlet. *Do not* turn on the power switch until all other connections have been completed.

CONVENIENCE OUTLETS:

Six convenience outlets have been provided on the rear panel to power associated components in your system. Of these outlets, four are controlled by the front-panel On/off switch (1000 Watts total) and are for use with tape recorders, tuners and other accessories. The two remaining outlets are unswitched and are for use with turntables that have built-in power switches mechanically linked to disengage their rubber idler wheels.

NOTE: We *do not* recommend using these outlets with amplifiers. AMPZILLA *cannot* be plugged into these outlets. Under no *circumstances* should a three-to-two prong adapter be used to plug the AMPZILLA line cord into one of THAEDRA's convenience outlets! To keep within its warranty provisions, AMPZILLA *must* be powered directly from a wall outlet where the third wire can be grounded (No ground wire is required or recommended for THAEDRA).

SIGNAL CONNECTIONS

Two stereo sets of audio output jacks are provided for connection to power amplifiers or electronic crossovers. Special audio cables with gold-plated contacts have been supplied for this purpose. The gold-plated contacts have the low resistance necessary for a reliable inter-connection throughout the life of the equipment; additionally, the high-quality coaxial cable with braided shield guarantees isolation from external electrostatic radiation.

The stereo output jacks are labeled MAIN 1 and 2. They are both identical and are time-delayed by a relay upon turn-on to prevent voltage surges from exciting a power amplifier which may already be turned on.

Make certain that the cable contacts are fully engaged so that no loss of circuit ground return exists when the equipment is turned on. A very loud hum or buzz will be heard if this condition does occur.

The source impedances of the two main outputs are each 5 Ohms, low enough to permit the use of shielded, interconnecting cables up to 100 feet in length. Since its specifications are met driving 600 Ohm loads, THAEDRA is capable of driving over 100 power amplifiers (each rated at 75K Ohm input) with no increase in distortion.

TAPE OUTPUTS

Two pair of stereo output jacks are provided on the rear panel for connection to any tape recorder having a minimum load impedance of 5K Ohms or higher. Since the source impedance of each is 500 Ohms, cables up to 100 feet may be used without high-frequency attenuation. Unlike the main outputs, the tape-output signals are independant of balance, volume and tone control settings and are at a level equal to the source-input level (Tuner, Aux, Etc.)

NOTE: The TAPE OUT stereo phone jack on the front panel has been provided for tape-copying purposes and may always be utilized in the same manner as the rear outputs. (Refer to the paragraph on TAPE COPYING)

SOURCE CONNECTIONS

TUNER INPUT:

This is a high-level input with a rated sensitivity of 0.2 Volt. Although labeled TUNER (AM or FM), this input may be used with any high-level source. The rated input impedance is 36K Ohms with the volume control at maximum and increases to 53K Ohms when the volume control is at minimum. This condition exists only with the push-button source selector in the "TUNER" position, otherwise it is zero Ohms (Shorted).

NOTE: Because of THAEDRA's unusual circuitry, the input voltage handling capability of all the high-level inputs is *infinite!*

AUXILIARY INPUTS:

The two stereo input pairs provided, labeled AUX 1 and AUX 2, are identical in operation and sensitivity to the TUNER input described above. They can be used with any auxiliary equipment having adequate outputs such as tape recorders, tuners, television receivers, etc.

TAPE INPUTS:

Three stereo pairs are provided, labeled TAPE 1 and TAPE 2 (Located on the rear panel), and TAPE IN (located on the front panel). These inputs, having identical impedances and sensitivities as the TUNER input, are for connection to tape-recorder line outputs.

PHONO INPUTS:

Two sets of phono inputs are provided; one, labeled MAG PHONO is for use with conventional magnetic phonograph cartridges, and one labeled HEAD AMP is for use with low-output-level moving-coil cartridges. The kind of phonograph cartridge used determines which of the two phono inputs should be connected to your tone-arm cables.

MAGNETIC PHONO: All conventional magnetic cartridges (and other types which require RIAA playback equalization but which do not require input sensitivities below 1.6mV) may be used with this input. The rated input impedance is 47K Ohms (100 pF shunt capacitance) which is standard for magnetic phonograph cartridges. Overload capability is 110mV @ 1kHz which will accommodate even those cartridges considered to be "High-output" types.

Well-shielded cable is recommended for connecting to the cartridge and is usually supplied as part of the turntable or changer. Where longer distances are desired for this connection, it is not recommended the phono cables exceed 5 feet, otherwise audible degradation of high frequencies might be encountered. Special care must be taken that all connections are tight and secure.

Ordinarily, an additional grounding wire is provided with the turntable which should be connected to the grounding post located between the phono inputs on the rear panel. In some systems, it might be found that this connection creates hum. In this case, no ground connection should be made. Be careful to keep all large transformers (such as found in power amplifiers) away from the phono cartridge to prevent magnetically-induced hum.

HEAD AMP: This input is for use with low-output moving-coil cartridges. THAEDRA has special circuits with 67 microvolt sensitivity (Overload: 4.7mV) which will accommodate these very low-output cartridges without the need for transformers or pre-preamplifiers. The input impedance is 600 Ohms (with 0.1uF shunt capacitance), which provides negligible signal loss and frequency response modification with moving-coil type cartridges.

Although cables up to 15 feet may be used without affecting the cartridge frequency response, special care must be taken to prevent hum pickup in the cables. They must not only be well-shielded, but the cables must be kept away from any AC power transformers. If any hum is heard, try moving the cables to some other position, routing it as far as possible from any potential magnetic fields. The two left and right channels should be kept together and twisted a few times. If hum still persists, again be certain that *no* large power transformers are near the left side of THAEDRA.

SPECIAL NOTES ON HUM REDUCTION

Probably the most frustrating problem with low-output moving-coil cartridges is hum. A great percentage of the time it is the result of improper installation and lack of care when orienting components. Unfortunately, either by poor design or the very nature of the component, some components are more prone to hum than others; and *no* cable made is entirely immune to radiated magnetic flux (hum). It follows then, that *all* cables in the system must be oriented for the lowest level of hum.

The connecting cables from the turntable will pick up far *more* hum than any other source. These cables must be oriented for maximum hum cancellation. *All* wires carrying AC power should be located as far away from the turntable and pre-amp input as is physically possible. *Under no circumstances* should you ground the turntable or grounding post to a water pipe or other such ground. Only *through* the *power amplifier* should your system be grounded to earth. If your power amplifier does not have a third-wire ground, we advise you have a qualified technician install one as a safety feature.

Although sometimes awkward, rotating the power amplifier at right angles to the preamplifier will alter the radiation field from its power transformer. Placing metal sheets between units will not aid in the reduction of hum because the magnetic flux field will extend around the shield.

Hum can also be introduced by a poor cable connector contact with the outer grounding shell of the plug. Make sure that the outer shells on the RCA phono plugs are squeezed together enough to provide an absolutely solid ground connection. Try rotating the plugs to obtain the best possible ground.

OPERATION

When first operating THAEDRA, set the controls as follows:

MODE:	Stereo
TAPE MONITOR:	Out
LOW FILTER:	Off
TAPE COPY:	Any position
BASS & TREBLE:	Flat (Mid-position)
BALANCE:	Mid-position
LEVEL:	Minimum (Counter-clockwise)
SELECTOR:	Desired source

Press the power switch on; the pilot light should now glow. Increase the level control to the desired loudness. For detailed operation of each control, read the following:

CONTROLS

POWER SWITCH:

This push-push switch turns on THAEDRA simultaneously with any equipment that has been plugged into the rear-panel switched convenience outlets. A time-delay relay will cause a wait of approximately 10 seconds before power is applied to the internal circuits. This feature prevents turn-on voltage impulses from reaching the power amplifier. Power turn-off is instantaneous when the off button is pressed. You should always wait at least 6 seconds before turning the unit on again in order to permit relay recycling. Prior to turning THAEDRA off, it is advisable to turn down the level from very loud settings.

LEVEL CONTROL:

This controls the output loudness of both channels simultaneously. Its stepped, discrete-resistor construction maintains inter-channel balance within 0.5dB at all settings. It has no effect on the signal at the TAPE OUTPUT jacks.

BALANCE CONTROL:

This control alters the ratio between the left and right channels. It is useful in achieving a balanced sound level where the speakers are at different distances from the listener or they are of dissimilar efficiencies. The exact center of the control is detented.

BASS CONTROLS:

These controls alter the low-frequency response of the two channels below 600Hz. The precise alterations can be seen in Figure 3. Its stepped, discrete-resistor construction insures a channel-to-channel accuracy within 1dB throughout its range. When used in conjunction with the low filter, a wide range of corrective alteration is possible, partially negating deficiencies in speakers and source material.

TREBLE CONTROLS;

These controls alter the high-frequency response of the two channels above 1800 Hz. The precise alterations can be seen in Figure 3. They have the same stepped, discrete-resistor construction as the BASS controls. The boost positions incorporate supersonic filtering in a Gaussian frequency distribution. The resultant smooth curve causes a minimum phase distortion of high frequencies and provides the least-objectionable interference from noise.

LOW FILTER:

Four positions of low-frequency attenuation are provided by this control. Attenuation occurs at the rate (slope) of 12dB per octave below the selectable turnover frequencies of 10, 20, 30 or 50Hz. It is useful where your turntable and/or record has rumble interference. Although the rumble frequency might be below audibility, and thus not heard directly, its effect can sometimes be heard as intermodulation distortion occuring in either the amplifier or speaker. Its use might thus clean up the sound clarity in the mid or high-frequency range. The use of the low filter in conjunction with bass boost extends the flexibility of the available bass compensation.

MODE SWITCH:

This switch determines how the source inputs are channeled to the output jacks. It functions as follows:

A. The left channel is connected to *both* outputs.

B. The right channel is connected to *both* outputs.

A+B. . . . . Both channels are combined and the mixed (Mono) resultant is connected to *both* outputs.

STEREO. . . . This, the normal position, connects the left input to the left output and the right input to the right output.

REV. . . . . This position connects the left input to the opposite (right) output and the right input to the opposite (left) output; simply reversing the STEREO mode described above.

TAPE MONITOR:

The normal position for this control is either one of the two labeled OUT. When at OUT, the signals selected by the source push-buttons may be heard. When you wish to monitor any of the tape recorders connected to the tape inputs of THAEDRA, simply turn the control to either of the three positions corresponding to the appropriate recorder.

While in the TAPE 1, TAPE 2, or TAPE FRONT position, the signal selected by the push-button source selector will be disconnected and the signal from the selected tape recorder's output will be substituted. The originally selected source signal will, however, continue playing into the TAPE OUT jacks. Thus, by rapidly switching between the OUT position and the desired TAPE source, the two signals can be compared while recording. Of course, this direct monitoring can only be achieved with recorders having adequate head provisions for this purpose.

TAPE COPY:

This switch makes possible, without resorting to external "patch cords", extremely versatile interconnections (for copying or editing purposes) between any of the three tape recorders connected to THAEDRA. It functions as follows:

1-2. . . . . .TAPE 1 *inputs* are connected to TAPE 2 *outputs.* (ie: The signals from tape recorder 1 are fed out *to* tape recorder 2.

1-F. . . . . .TAPE 1 inputs are connected to the front-panel TAPE OUT jack.

2-1. . . . . .TAPE 2 inputs are connected to TAPE 1 outputs.

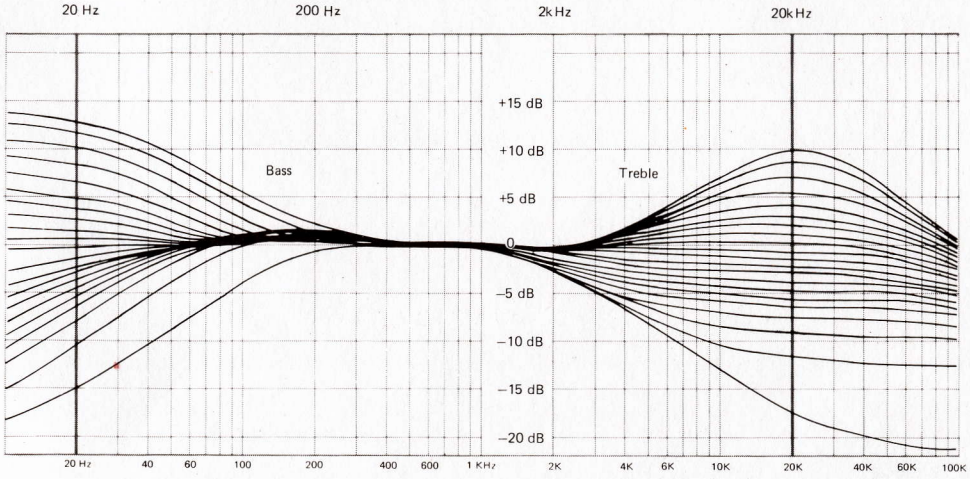
2-F. . . . . .TAPE 2 inputs are connected to the front-panel TAPE OUT jack.

F-1. . . . . .The front-panel TAPE IN jack is connected to the TAPE 1 outputs.

F-2. . . . . .The front-panel TAPE IN jack is connected to the TAPE 2 outputs.

NOTE: It is impossible to record the signal from the push-button source selector onto the recorder corresponding to the second digit of the TAPE COPY switch position. For example, if the copy switch is in position 1-2, the tape recorder connected to the TAPE 2 jacks will *only* receive a signal from tape recorder 1. It will *not* receive the signal selected by the source-selector push-buttons (PHONE, TUNER, AUX, etc.). To record the source-selected signals onto recorder 2, the TAPE COPY switch must be in any position other than 1-2 and F-2.

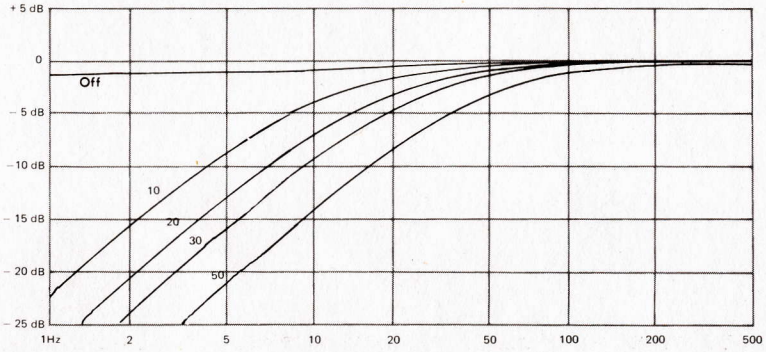
Figure 1. THAEDRA SERVO-LOOP TONE CONTROL CHARACTERISTICS



HEADPHONES:

Either of the two HEADPHONE jacks accepts phones with impedances of 100 Ohms or more. The upper jack leaves the power amplifier connected, while the lower jack automatically disconnects the power amplifier for headphones-only listening.

Figure 2. THAEDRA LOW-FILTER CHARACTERISTICS



SPECIFICATIONS

HEAD AMP:

Gain	70dB @ 1000Hz
Input impedance	Approximately 600 Ohms (0.1uF shunt)
Input sensitivity	Approximately 67 microvolts @ 1KHz
Input overload	Approximately 4.7 millivolts @ 1KHz
Equivalent input noise	Less than 0.1 microvolt 20-20KHz
	Less than 0.04 microvolt 400-20KHz
Output impedance	Approximately 500 Ohms

PHONO 2 (MAG):

Gain	42dB @ 1000Hz
Input impedance	47KOhms (100pF shunt)
Input sensitivity	1.6 millivolts @ 1KHz
Input overload	Approximately 110 millivolts @ 1KHz
Equivalent input noise	Less than 0.6 microvolt 20-20KHz
	Less than 0.25 microvolt 400-20KHz
Output impedance	Approximately 500 Ohms

HIGH LEVEL INPUTS:

Gain	20dB @ 1000Hz
Input impedance	Level control dependant
	53K Ohms @ full C.C.W.
	36K Ohms @ full C.W.
Input sensitivity	200 millivolts @ 1 KHz
Input overload	Essentially infinite
Equivalent input noise	Less than 5 microvolts 20-20KHz

OUTPUTS:

MAIN output impedance	5 Ohms Effective
TAPE output impedance	Source impedance
Output load impedance	Not less than 100 Ohms for MAIN
	Not less than 10K Ohms for TAPE

ALL SPECIFICATIONS ARE DERIVED AT 2 VOLTS OUTPUT INTO A 600 OHM LOAD (Except TAPE which is driven into a 10K Ohm load)

GAS
THE GREAT AMERICAN SOUND CO. INC.
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