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SPACE AND IMAGE COMPOSER  
OWNER'S MANUAL

**AUDIONICS**  
of Oregon

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### A BRIEF HISTORY OF QUADRAPHONIC SOUND

The commercial concept of quadraphonic sound reproduction was introduced in the late 60's. Unfortunately, the early decoding equipment was not able to meet the requirements of the serious music listener. Most demonstrations left the average listener less than impressed. Nevertheless, many audiophiles and several manufacturers realized the ultimate potential of four-channel sound when properly recorded and decoded. AUDIONICS of OREGON has been involved with four-channel development for nearly ten years. Our aim has been to produce a high-performance system to meet the requirements of the most serious audiophile. Now with the availability of the TATE DIRECTIONAL ENHANCEMENT SYSTEM (DES), the system is now a commercial reality.

Aside from hardware limitations, the early days of quadraphonic sound were complicated by various commercial interests proposing one system or another. Virtually all of the systems have fallen by the wayside...with the exception of the CBS SQ System. Because of the competition between various interest groups in the promotion of one system or another, a large amount of mis-information has reached the consumer adding to the public confusion. When confusion is created the overall result is stagnation. AUDIONICS of OREGON does not have a commercial interest in producing software, much less attempting to battle giant corporate interests. Years ago, we determined, from strictly a technical standpoint, that the SQ System meets the overall requirements of the serious music listener, the commercial broadcaster, and the limitations of record production. Now the Space & Image Composer incorporating the TATE DES more than meets the challenge to provide audiophile standard four-channel reproduction. The Composer will accurately decode SQ encoded records with a 'discreteness' and fidelity matched only by four-channel tapes. The Composer also provides the capability for stunning enhanced stereophonic playback.

Unlike other systems promising 'discrete' performance based on the use of carrier signals pressed on the record groove wall, the SQ System requires a much simpler encoding format. In conjunction, with the TATE DES, separation from an SQ encoded disc equals or surpasses that of any other consumer oriented quadraphonic playback system...and without special cartridges or special record care.

SQ enjoys a number of technical advantages over other quadraphonic systems as a result of intensive development efforts by the CBS Technology Center. Because the CBS Technology Center is primarily the research and development center for CBS Television and Records, SQ was designed with stereo and mono compatibility foremost in mind. Other matrix systems suffer from a reduction in center front output when the encoded record is played in the stereo mode and the reduction in output is further worsened when listening in mono (such as a portable radio or automobile radio). In addition, the SQ System does not degradate the signal-to-noise ratio below that of conventional stereo program sources, nor does it reduce the coverage area of a stereo FM station when SQ encoded program material is being broadcast. The SQ System is a full-range high fidelity concept compatible with advanced high fidelity systems.

Why the SPACE & IMAGE COMPOSER utilizing the  
TATE DIRECTIONAL ENHANCEMENT SYSTEM is superior  
to all previous matrix decoders

Using a conventional matrix decoder, regardless of type, a stereo signal is applied to the input, and four channels of audio are provided at the output. Separation between channels with a simple matrix decoder is approximately 3dB at best. With logic or other types of previously available separation enhancement, separation figures of 10-20dB could be achieved. Unfortunately, the decoding action could be heard and such decoders sounded 'slow and sluggish' at best.

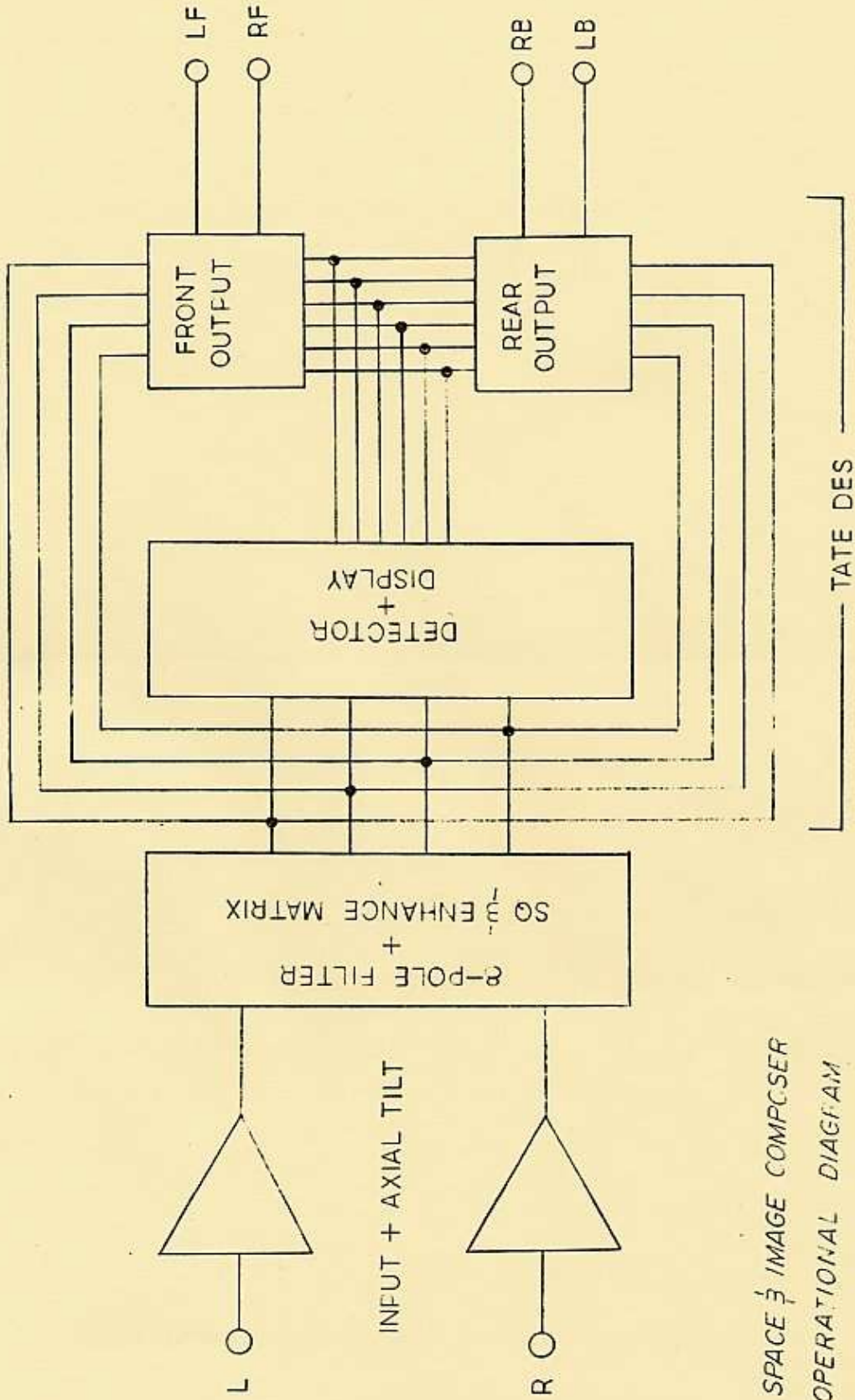
Like previous matrix decoders, the Composer uses a matrix filter in the front-end...but that is where the similarity ends! Most previous decoders used a simple 4-pole matrix filter. The Composer uses a precision 8-pole design that is far more accurate than 4-pole types. What occurs after the 8-pole filter is unique and far advanced over any previous directional enhancement concept.

The TATE DIRECTIONAL ENHANCEMENT SYSTEM (DES) is now added to the output of our 8-pole matrix front-end. The DES detects relative directionality of the four matrix signals and enhances that directionality. For all practical purposes, the TATE DES can be thought of as a separation multiplier. 3-4dB of separation into the TATE DES yields 30-40dB of separation between channels. This is more separation than even the best commercially available phono cartridges are capable of. As opposed to logic, wavematching or split-band decoders, the TATE DES operates effectively faster than the ear can assimilate information. For illustrative purposes let us consider how a motion picture projection system works. If you observe one single motion picture frame, it obviously appears as a still (non-moving) frame. When the frames are advanced rapidly past the shutter in the film projection gate, the illusion of movement in conjunction with detail is provided. The TATE DES works in much the same manner. Because of the speed and smoothness of the decoding action of the TATE DES, your ears perceive a sound field that is coherent and just as 'discrete', for all practical purposes, as even a four-track discrete tape.

Why the TATE DES Improves Conventional Stereo Recordings

Conventional four-channel decoders have offered a 'stereo-enhance' function in the past. However, just as those decoders were limited in their ability to provide separation of encoded discs, they could at best audibly recover only a marginal amount of out-of-phase ambient material from a stereo disc. The Composer also offers a 'stereo-enhance' function, but with the performance strengths of the TATE DES.

When listening to a stereo record, the TATE DES positions the extreme left and right front information on the left and right back speakers. Center front information remains center front. Intermediate instruments and vocals fill in, creating wall images and left and right front information. Depending upon how the mix is executed, images may



be created in the center of the room, overhead, or beyond the perimeter of the speakers because of psychoacoustic effects. Any out-of-phase information (ambient information) that is normally not heard during a stereo playback because of electrical cancellation, is recovered and placed by the DES in the back quadrants of the room. Thus real-time ambient information as well as enhanced directional effects are achieved. The effect is stunning, and often it is virtually impossible to distinguish between a properly encoded four-channel record and a stereo record when using the stereo enhance mode of the Composer.

### Peripheral Equipment

To achieve optimum performance from any four-channel system, we suggest that certain guidelines be followed. The following suggestions are the result of years of study in the combined areas of electronics, mathematics, and psychoacoustics.

**Loudspeakers.** Contrary to the requirements of time-delay systems or simple ambient recovery devices, the front and back speakers must be identical for optimum results. You would not consider mixing two dis-similar loudspeakers for the left and right front in a stereo configuration. The Composer creates center room, wall, and discrete as well as ambient back channel information. Obviously to produce a coherent sound field with minimum coloration, you do not mix loudspeaker types. It is possible, with some reduction in audible performance of the system, to mix systems from the same manufacturer with similar sonic characteristics, but again, we do not recommend it. Any 'authority' that tells you otherwise is uninformed and providing mis-information!

There is no perfect loudspeaker, however; a loudspeaker for use in a quadraphonic system should exhibit certain desirable characteristics. There are a number of loudspeakers available which provide excellent performance for stereo applications and have the respect of the 'audiophile' community. Unfortunately, many of these loudspeakers do not meet the requirements necessary to create realistic quadraphonic reproduction. An 'ideal' loudspeaker for quadraphonic applications meets the following requirements:

- Wide and Uniform Dispersion over the entire audio range
- Linear Amplitude Response both on and off axis
- Excellent Transient Response
- Point-Source Radiation

The effect that is desirable is 'SPACE'...a three-dimensional sound field, where images may be perceived anywhere in the field. Some listeners opt for maximum separation between speakers, but when carried to the extreme, the coherency of the sound field collapses and suddenly you have four sources of audio in your room, and not a three-dimensional field of 'space'.

It is apparent that speakers producing both direct and reflected sound will work much less satisfactorily than loudspeakers meeting the criteria noted above. In addition, speakers radiating from both the front and rear fail to meet the requirements necessary for optimum quadraphonic performance.

There are many loudspeakers that will offer the desired performance. AUDIONICS of OREGON has not auditioned all of the current loudspeakers available from national and internationally known manufacturers, but we can recommend, with confidence, the following loudspeaker systems. Remember that from the standpoint of transparency and coloration, all loudspeakers will differ, but the systems listed below excel in characteristics necessary for convincing quadrasonic reproduction.

ADS (all models but particularly L630 and BC8)  
KEF (all models)  
B & W (all models)  
Polk Audio (all models)  
Cizek (all models)  
Advent (all models)  
Dahlquist DQ10 (when used in larger room)  
Axiom Engineering (all models)  
Morduant-Short (all models)  
Spica, LS3/5a and most other miniature monitors

If your pocketbook will allow, we also suggest the Beveridge System 2 and 3. The Beveridge Systems are the only full-range electrostatics that we are aware of meeting the requirements necessary for optimum quadrasonic reproduction.

**Electronics.** Just as you would not mix dissimilar loudspeakers, the mixing of dramatically different electronics is not recommended. Contrary to what some 'experts' may tell you, there are audible, and often, dramatic differences in the sonic qualities of preamplifiers and power amplifiers as well as receivers. The differences have been the subject of many discussions by audiophiles all over the world and we shall not go into the arguments and reasons, but they do exist. Electronics from the same manufacturer, generally, have similar circuit designs and sonic characteristics. The power requirements for the back channel amplifier are somewhat less. A bonus for apartment or condominium dwellers is the fact that a properly balanced quadrasonic speaker system will provide a subjective 4 to 6 dB increase in sound pressure level while in reality, the measured sound pressure level will not increase or simply state...X amount of power into four speakers provides a subjective increase over two speakers. Rock music lovers take note!

**Cartridges.** Within the limitations of your desires and pocketbook, you should choose a cartridge with midband separation of 20-25 dB and excellent phase tracking between channels over the entire audio range. Some cartridges exhibit an increasingly large phase error as frequency increases. This may result in image shift of some high frequency overtones resulting in poor localization of percussion instruments. Consult your dealer or the manufacturer if you have any questions regarding this specification.

**Interconnect Cables.** We recommend the use of 'Monster Cable' for the connection of the amplifiers to the loudspeakers. Other exotic cables are available, however; you may wish to consult your dealer regarding the use of such cables with your amplifier. Some cables may create amplifier instability which can lead to equipment failure. 'Monster Cable' is perfectly safe for use with all amplifiers. Likewise,

high quality, low capacitance interconnect cables between your preamplifier or receiver inputs and outputs is desirable.

#### Installing the SPACE & IMAGE COMPOSER in your System

Before the Composer is placed on a shelf, or mounted in a rack, there are some internal user adjustments which should be considered. First, remove the cover from the Composer. The cover is fastened with 6/32 x  $\frac{1}{4}$  machine screws. Remove the top cover only. Do not touch any of the trim pots within!

**AC Voltage (Mains) Selection.** The primary operating voltage selection is achieved by the positioning of the internal fuse. When the internal fuse is inserted into the two fuseclips marked '120', the Composer will function properly from 90 VAC to 140 VAC 50/60 Hz. When the internal fuse is inserted into the two fuseclips marked '240', the Composer will function properly from 200 VAC to 260 VAC 50/60 Hz. The Composer may be used in any location in the world simply by changing the location of the internal fuse and using the appropriate mains plug to meet local requirements. **THE AC MAINS CORD MUST NOT BE PLUGGED INTO A MAINS SOURCE WHEN MAKING THE FUSE ADJUSTMENT!**

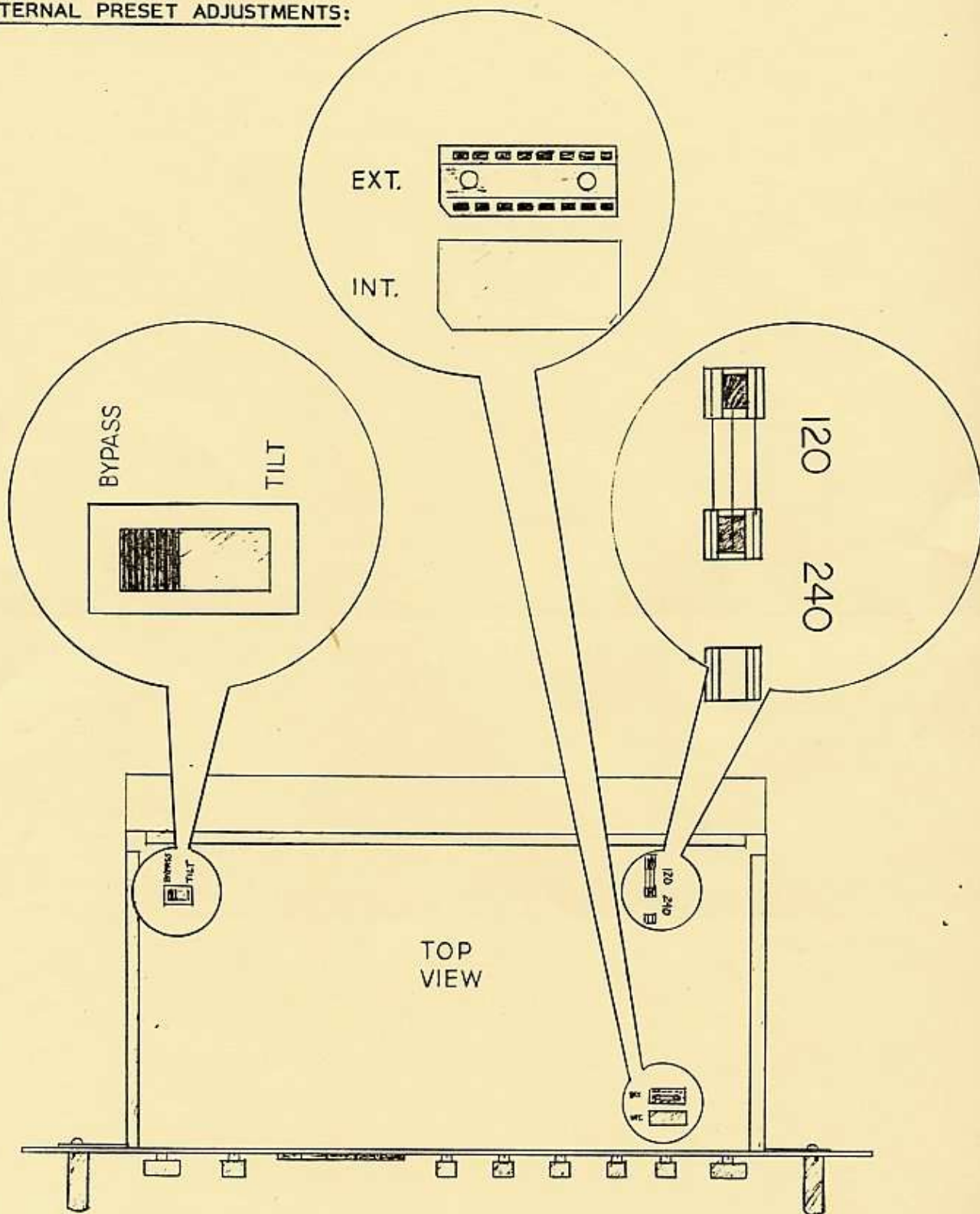
**NOTE:** When your Composer was shipped from the factory, it was preset to operate from the primary mains voltage prevalent in the area to which it was shipped. If your needs differ, or if purchased away from the area in which the Composer is to be used, you may have to make a Mains voltage change, as described above. Whenever a Mains voltage selection is changed, both the internal and external fuse values should be changed to the proper values:

Mains	Internal	External
120 VAC	1/2 Amp FB	3/8 Amp FB
240 VAC	1/4 Amp FB	3/16 Amp FB

**WARNING** Damage done to Composers operated from the wrong mains voltage, or operated with improper fuses is not covered under warranty.

**INTERNAL/EXTERNAL CONTROL OPERATION.** As shipped from the factory, your Composer is set-up to properly operate using the front panel controls. If you are using the **OPTIONAL** Remote Control Unit, you must change the position of the INT/EXT Jumper located directly behind the LF/RF output balance control. This jumper is a 16 pin, dual in-line jumper plug, and you will find it inserted into the 16 pin socket on the circuit board marked 'INT'. When the jumper is inserted into the 'INT' socket, all controls on the front panel function normally. If you use the optional remote control unit, you must remove the jumper plug from the 'INT' socket and re-insert it into the socket marked 'EXT'. If you use the remote control unit without changing the jumper plug, the only function that will operate on the remote control unit will be the directional display and input threshold/peak indicator. Exercise care in changing the jumper from the INT socket to the EXT socket. It can be damaged by carelessness!

INTERNAL PRESET ADJUSTMENTS:





In the EXT mode (remote operation), all front panel balance controls, output level controls, separation control and Solo Null switch are disabled, and their functions are delegated to the Remote Control Unit (with the exception of the Solo Null switch which is inoperative in the EXT mode).

**BYPASS SELECT SWITCH.** Internally, in the corner closest to the input jacks, is located a slide switch marked 'Bypass/Tilt'. This switch selects what type of output appears at the LF and RF output jacks when the Stereo Bypass mode is selected on the front panel of the Composer. With the switch in the Bypass position, the audio output will be a straight-through bypass, from the input jacks through a set of switch contacts, directly to the output jacks with NO electronic processing. With the switch in the Tilt position, this output is processed through the Axial Tilt Correction Circuitry before it reaches the output jacks, so that the Axial Tilt Circuit may be utilized for stereo correction independently from a four-channel mode.

**NOTE:** While making the internal preset adjustments, DO NOT touch any other adjustments or trimpots. Your Composer was calibrated at the factory by trained personnel utilizing special test instrumentation required for proper set-up. If any controls are adjusted, the performance of the Composer will be severely impaired and it will have to be returned to the factory for re-alignment. A re-calibration charge will apply to any Composer returned for warranty repair where these calibrations show signs of tampering.

#### INITIAL SET-UP PROCEDURE

**NOTE:** It is EXTREMELY IMPORTANT that all inputs and outputs are maintained left for left and right for right. It is equally important that all four speakers are in phase with each other. The presentation of a coherent soundfield relies on proper left-to-right orientation and proper speaker phasing. If any inputs/outputs at any point in the system, are out of phase, or inverted right for left, or vice versa, the resulting sound field will be very disconcerting, annoying, and listening fatigue may well be the result! Recheck the system wiring if there is any doubt. Virtually all commercially produced loudspeakers have positive (+) and negative (-) markings on their input terminals. Likewise, virtually all cable connecting the amplifier to the loudspeaker, has a coded indicator for phasing purposes. Use the same code for all amplifier outputs and loudspeaker inputs.

**INPUT SIGNAL.** The Composer input requires a PURE STEREO SIGNAL. The purer the input signal, the better the performance of the Composer. This signal is available at the main preamplifier output, or from the stereo tape output of your receiver or integrated amplifier. Any additional processing ahead of the Composer input, such as a noise reduction system (Dolby System excepted), expander/compressor, or equalizer, can sometimes interfere with the decoding operation of the Composer by changing the phase and amplitude relationships present in the unprocessed stereo signal. These relationships must be preserved, as the Composer utilizes these as criteria for making separation and directionality 'decisions'. If the test

record performance through the system is unaffected by the addition of a processor, then you may assume that the processor can be used without seriously affecting the performance of the Composer. Of course, if any processing is required after decoding, it may be used.

**NOTE:** Certain records and FM stereo broadcasts may have processing anomalies present beyond the capabilities of the Composer. Usually, such anomalies are not obvious unless listening to one channel only or at worst as a brief 'flutter' on the rear channels.

**OUTPUT (MAIN) SIGNALS:** The four main outputs signals of the Composer drives four channels of amplification directly, without the need of additional preamplification. All necessary balance and level controls are provided on the Composer. The outputs all have source impedances of less than 500 ohms enabling the Composer to be located up to 50 feet from amplifiers without degradation of frequency response.

**ADDITIONAL INPUTS/OUTPUTS:** The Stereo Tape output of the Composer provides an axial tilt corrected signal to a tape deck or processor. Output level is dependent on the setting of the input level control. The external discrete input allows a four-channel source to be directly connected to the four-channels of amplification without re-connection or patching of cables. Some uses include the playing of four-channel discrete tapes or the use of an external matrix decoder or CD4 demodulator. These signals do not pass through the TATE Directional Enhancement System, and the balance and level controls have no effect. This is a straight-through connection.

**WARNING:** All level control must be accomplished at the unit supplying the external discrete four-channel signal. Some tape decks and demodulators have no output level control and provide line level signals which may damage your loudspeakers, if used without attenuation.

**ACCESSORY INTERFACE:** The accessory Interface provides inputs/outputs necessary for remote control, as well as drive signals for external displays, including light shows, lasers and strobes for professional application including use in Disco's. When using the optional remote control unit, a special AMP connector must be installed on the unit, and the internal/external plug changed, as previously discussed. **NOTE:** On earlier Composers (Serial number 12225 and down), a jumper wire must be installed on the bottom of the circuit board in order to use the remote display in the remote control unit. Consult your dealer or the factory for details.

**USING FOUR-CHANNEL QUADRAPHONIC RECIEVERS:** When using a four-channel reciever as the preamplifier/amplifiers in your four-channel system, care must be exercised when determining just where a PURE STEREO signal can be obtained when the unit is in the four-channel mode. In order to make use of all four-channels of amplification, you must put the unit in a four-channel mode, as many manufacturers bridge the amplifiers for more power when operating in the stereo mode. However, when a four-channel mode (RM, SQ, QS, or CD4) is selected, the tape monitors are switched to four-channel, negating their use as a stereo source, with which to

drive the Composer. Almost all four-channel receivers have a stereo-only tape monitor, which remains stereo, regardless of mode selection. It is usually in parallel with one of the four-channel tape monitors. Quite often, this stereo signal is NOT available through the standard RCA type phono jacks. If this is the case, they are usually available through a 5-pin DIN type socket (see illustration). In order to hook-up the Composer to this connector, you must obtain a 5-pin DIN cable with four RCA type plug on the opposite end of the cable. It is usually available at most audio and electronic parts stores. After plugging the 5-pin DIN connector into the receiver, you must determine which two of the four phono plugs has a signal present. Two of the plugs will have no signal as they are tape monitor inputs. Only two will have the desired stereo signal with which to feed the Composer input. Use the supplied test record to determine which is left and which is right. Consult the owner's manual for your receiver if you have any difficulty locating or indentifying the Stereo-only tape monitor.

Once the proper stereo-only signal is obtained, connect this to the Composer stereo input jacks. If left and right channel designations are unknown, hook them up either way, we will correct this later. Now connect the four main outputs of the Composer to the four corresponding tape inputs on one of the four-channel tape monitors (tape input). On the front panel of the receiver, select the proper tape monitor, if there is more than one, and put the tape monitor switch in the MONITOR position. Now, the four amplifiers are 'listening' to the signal present at the Tape input of the four-channel tape monitor (now the Composer output signals). This completes the basic set-up for quadrasonic receivers.

**SEPARATE AMPLIFIERS AND PREAMPLIFIERS:** When utilizing separate preamp and power amps, drive the Composer input jacks from either a tape output or from the main output jacks. The main output jacks may be preferred so that the tape monitor may be used for a tape deck. The main outputs of the Composer will drive the power amplifier directly. Using the main outputs of the preamplifier will also allow you to use the level and tone controls of the preamplifier when using the stereo bypass mode on the Composer for stereo-only listening.

**STEREO RECEIVERS:** When using a stereo receiver as a preamp and amplifier, first verify whether the preamp and amp sections may be used independently. If they can be, there will be two preamp output jacks, and two power amplifier input jacks. When used as a stereo receiver, these jacks are tied together by external jumper plugs or cables or a rear panel switch (consult receiver manual). If these functions can be separated, drive the Composer input from the preamp out jacks (after separation of the preamp/amp sections of the receiver has been carried out). Then drive the amplifier input jacks from either the front or rear Main Composer outputs. The unused pair of Composer output jacks will drive the other amplifier.

If the preamp and power amp are not connected in such a manner, the Composer must be driven by the Tape Out jacks on the receiver. The proper tape monitor is selected and either the front or rear main Composer outputs are connected to the Tape-In (or monitor, or play) jacks. The unused pair of main Composer output jacks are connected to the other amplifier.

If a stereo receiver is to be used as the other stereo amplifier, select either tuner or aux input on the mode switch, and drive the corresponding input jack on the receiver with the Composer outputs. For integrated amplifiers, follow the same procedure as with a stereo receiver.

**NOTE:** When using Tape Output signals to drive the Stereo Input of the Composer, the only control you have over the input level to the Composer is the Input Level Control on the Composer, as tape outputs are a fixed level. When using the preamplifier main output as a source of the signals for the Composer input, not only can you control the input level with the Input Level Control on the Composer, but also with the receiver/preamp output level control or volume control.

In order to begin calibration procedures, preset the controls as indicated:

Preset these controls to full Counter-Clockwise Position

1. Preamp (Receiver) Volume or Level Control
2. Composer Input Level Control
3. Composer Output Level Control (Minimum while still maintaining Power On!)

Preset the following controls to Full Clockwise

1. Composer Separation Control
2. Composer Stereo Enhance (rotary) Control

Preset the following controls to Center of Rotation

1. Preamplifier (Receiver) Balance Control
2. Composer Input Balance Control
3. LB-RB, B-F, and LF-RF Composer Stage Balance Controls

Preamplifier (Receiver) Selector Switch should be set to Phono position with the Composer SQ function button depressed, and Phono Tilt function released (disengaged). Set Solo Null switch to Null position.

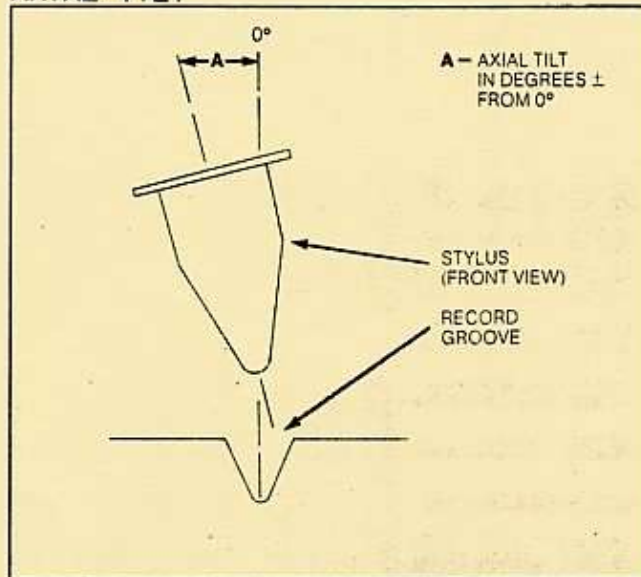
**INPUT LEVEL AND BALANCE CALIBRATIONS:** Place the supplied SQ Test Record on the turntable. Turn the preamplifier volume control up to about 1/2 volume. Play the Center Front Test Signal. Turn up the Composer Input Level Control. You will notice that the Center Pilot Light on the display (yellow/orange color) will extinguish, then after a degree of rotation, it will come on again. When the center indicator goes off and display directional information comes on, then the input level is adequate. When the Center Pilot Light comes on along with the Display Directional information, then you have reached input overload and the input level control should be slightly reduced to below the overload point, (if overload cannot be achieved, turn up the preamplifier volume control to insure that adequate dynamic headroom is available).

Rotate the B-F Balance Control fully counter-clockwise so that you are listening only to the back speakers. While listening to the crosstalk from the Center Front Signal in the Back Channels, rotate the Composer Input Balance Control back and forth until a null or maximum cancellation occurs. Adjust the Input Balance for maximum cancellation. Set the Solo Null Switch back to Normal. Now the Composer is balanced and you can proceed to the Directional Decoding Check-out.

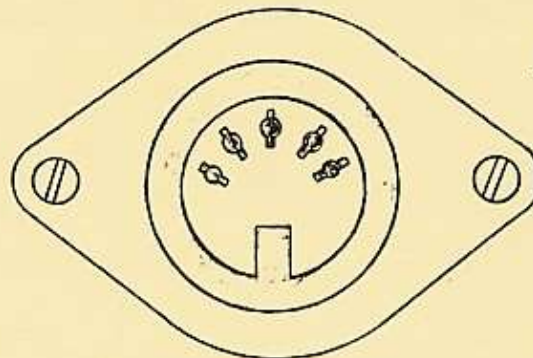
**DECODING CHECK:** Now that the input level and balance controls are set, play the bands of the SQ Test Record with the appropriate channel identification information. Re-verify that you have the SQ position engaged on the front panel of the Composer. The order of identification is Center Front, Right Front, Center Right, Right Back, Center Back, Left Back, Center Left, Left Front, and again, Center Front. BE SURE THAT YOU HAVE RESTORED THE SOLO NULL SWITCH TO THE NORMAL POSITION BEFORE COMMENCING THIS TEST. You should visually be able to see the directional indicators 'follow' the test signals around the room, and the audio should come from the appropriate matching speaker location. If the test signals agree with the audio, then the amplifiers and speakers are set-up properly. If there is any discrepancy, check all input/output connections as well as re-verifying the hookups from speakers to amplifier outputs. Once the decoding action matches with proper test signals, proceed with the Axial Tilt Adjustment. **DO NOT PROCEED UNTIL ALL SYSTEMS APPEAR TO BE WORKING PROPERLY. REMEMBER, THE DISPLAY IS AN INDICATOR OF COMPOSER DECODING FUNCTION ONLY.** As previously mentioned, speaker and amplifier phasing must be maintained for proper imaging and localization of directional information.

**AXIAL TILT CALIBRATION:** Axial Tilt Correction corrects for anomalies that are related to inaccurate phase tracking of left and right channels of your phono cartridge that cannot be corrected by the Composer Input Balance Control. Once adjusted, the Axial Tilt adjustments will not have to be repeated unless the arm/cartridge adjustments are changed, or if the Composer is used with another turntable or system. Using the supplied test record, play the band that contains SQ channel identification signals. Locate the Axial Tilt adjustments directly forward from the input jacks on the rear panel of the Composer chassis. Rotate the B-F control on the front panel of the Composer full clockwise (front speakers only), now rotate the LF-RF control full counterclockwise so that only the LEFT front channel is audible. Now listen to the RIGHT FRONT test signal 'leaking' into the LEFT channel. Making sure that the Phono Tilt position on the front panel is engaged, carefully turn the LEFT NULL potentiometer with a small screwdriver until the right channel crosstalk is minimized. You will have to turn the control back and forth until you hear when the crosstalk is cancelled to the maximum degree. Now repeat this procedure for the RIGHT CHANNEL by turning the LF-RF control to RF only and playing the LEFT FRONT test signal and minimizing crosstalk with the RIGHT NULL potentiometer. Once these adjustments have been made, the Axial Tilt Correction circuit is properly calibrated. When using a tape deck or FM Stereo tuner as the audio source for the Composer, the Axial Tilt function button on the front panel of the Composer should be disengaged. If you find very little correction required with the alignment of your cartridge, then rejoice! This means the factory assembly

## AXIAL TILT



AS SHOWN IN THIS EXAGGERATED EXAMPLE, THE STYLUS/CANTILEVER ASSEMBLY IS FREQUENTLY NOT PERPENDICULAR TO THE PLANE OF THE RECORD SURFACE. IDEALLY, THE STYLUS SHOULD BE ALIGNED VERTICALLY TO INSURE EQUAL CONTACT WITH THE LEFT AND RIGHT WALLS OF THE RECORD GROOVE FOR PROPER BALANCE, AS WELL AS MINIMIZING DETECTION OF OPPOSING WALL SIGNALS (CROSSTALK). UNTIL NOW, THE ELIMINATION OF THE LAST FEW DEGREES OF THIS VERTICAL ALIGNMENT ERROR HAVE BEEN VIRTUALLY IMPOSSIBLE WITHOUT THE USE OF EXPENSIVE TEST INSTRUMENTS NOT USUALLY FOUND IN THE HOME OF THE AVERAGE AUDIOPHILE OR QUADRAPHILE. THE AXIAL TILT FEATURE OF THE COMPOSER ALLOWS THE USER TO ELECTRONICALLY COMPENSATE FOR THIS ERROR WITHOUT THE NEED FOR ELABORATE TEST INSTRUMENTS. QUADRAPHONIC PERFORMANCE IS GREATLY ENHANCED BY THE CORRECTION OF VERTICAL ALIGNMENT ERRORS, FOUND IN MOST, IF NOT ALL, MUSIC REPRODUCTION SYSTEMS.

5 PIN DIN CONNECTOR:

THIS IS A 5 PIN DIN SOCKET OF THE TYPE THAT MIGHT BE FOUND ON SOME QUADRAPHONIC RECEIVERS FOR GAINING ACCESS TO A PURE STEREO SIGNAL SOURCE WHEN IN A FOUR-CHANNEL MODE OF OPERATION. SEE APPROPRIATE SECTION OF THIS MANUAL FOR FURTHER DETAILS.

of your cartridge is accurate and you have properly mounted and aligned the cartridge in your arm, you will not hear much difference on either the static test signals or in use with musical program material.

**FINAL ADJUSTMENT:** Rotate the B-F control to full F (front) position. Listening only to the front speakers while play music (recheck to insure that you have selected the proper function for SQ or Stereo Enhance depending upon which type of disc you are listening to), balance the front stereo stage using the LF-RF balance control. Now rotate the B-F control to full B (back) position and listening only to the rear channels, balance the back stereo stage by adjusting the LB-RB balance control. Now rotate the B-F control again to full front position and while listening to program material, slowly bring up the level of the rear speakers until the desired sound field is obtained. This is the last, and one of the most important adjustments. It may be compared to the focusing of a camera. If all the other settings are correct, but the camera is not in focus, you will not obtain a very high resolution photograph. When properly adjusted, the sound field should be very coherent from front to rear. Instruments, voices, effects, etc., should have a very three-dimensional quality. The sound field should sound uniform and realistic, and should appear to be coming from the 'stage' around or in front of you (depending upon whether you prefer 'surround' or conventional speaker placement) rather than from individual loudspeakers.

When decoding action is so aggressive that it can be heard on a properly set-up Composer, it can be softened by rotating the Separation Control counterclockwise until the 'flutter' goes away. Likewise, an image may be unstable because it is too wide to be cancelled. This is a phenomena caused by the actual mix of the record or the post-production processing and mastering. In some cases, rotating the Stereo Enhance rotary control about a quarter turn counterclockwise will result in more stable imaging and less flutter, and will sometimes reduce spatial distortion or 'stretched' images which are a result of the original record mix. In most cases, the anomalies appear on the rear channels only, and in most cases occur and pass so quickly that most listeners accept them in the same manner they accept minor ticks and pops on the record surface or tape dropout on a tape playback. Basically, if the recording integrity is good, you will not hear anomalies when the system is properly balanced, or the anomalies will be of a random and minor nature. Occasionally, a record is released with output level down on one channel which will require a readjustment of the Input Balance control.

#### ALTERNATIVE USES FOR THE COMPOSER

Although the Space & Image Composer was originally designed for use in high fidelity systems as a high definition SQ decoder and stereo to quadraphonic enhancement system, this does not by any means, limit the number of applications. Outlined below are applica-

**AXIAL TILT CORRECTION:** The Axial Tilt Correction circuit may be used independently of the decoding functions of the Composer. It can be used to minimize axial tilt error for regular stereo playback of discs (if internal Axial Tilt Bypass is not used) and also provide a tilt-corrected output for a stereo tape deck, whose playback through the Composer at a later date is maximized in terms of separation and phase integrity (as far as program material is concerned). The Audionics of Oregon RS1 Preamplifier also incorporates axial tilt correction. We have enclosed a copy of the RS1 color brochure which describes by graphic illustration exactly what axial tilt correction does... and the explanation is likewise valid for the Composer.

**VOCAL/SOLO INSTRUMENT ELIMINATOR:** By engaging the Solo Null function and listening to the Back Channels only, subliminal effects and 'buried' musical information can be extracted from complex multi-track mixes. Musicians will find this feature invaluable for learning harmonies, use of special effects, isolation of unwanted musical signals, and background instrumental work. Recording engineers can use this mode of the Composer to critique mixes, or extract sound mixing techniques from unknown, but desired effects.

**RECORDING/MIXING MONITORING:** The Composer can be used to judge electronic effects real-time, before they are added to the final mix by simply taking a stereo 'feed' from the mixdown console and monitoring in four-channel, either conventional or full-surround.

In the SOLO NULL mode of operation, the following Composer functions are used:

**Separation.** The Separation Control varies the amount of cancellation. By rotating the Separation Control counterclockwise, the cancelled Center Front program material can be blended into the back channels. Full Counterclockwise is about 3dB of cancellation, and full Clockwise is about 30-35dB of cancellation.

**Stereo Enhance.** The Stereo Enhance rotary control varies the 'width' of the cancellation 'shadow'. Full Clockwise produces a sharp (narrow) shadow, and full Counterclockwise produces a wide shadow width. This control is mix dependent, thus some variation in results should be expected with various discs.

**Input Balance.** The Input Balance Control varies the position of the cancellation shadow over the full stereo stage. The shadow may be panned to eliminate intermediate positions as well as Center Front. Full Clockwise position shadows or cancels far Left, while full counterclockwise shadows or cancels far Right, and by centering the control, you can cancel the solo vocalist or instrument.

**REMEMBER THE PRECEDING FUNCTIONS WHEN USED WITH THE SOLO NULL FUNCTION ARE FOR USE BY MUSICIANS AND ARE NOT DIRECTLY APPLICABLE TO NORMAL MUSIC LISTENING. THE SOLO NULL MODE IS NON-FUNCTIONAL WHEN USED WITH THE OPTIONAL REMOTE CONTROL.**



## PROGRAM SOURCE LIMITATIONS

Because of the technical capabilities of the TATE DIRECTIONAL ENHANCEMENT SYSTEM, most anomalies in reproduction can be attributed to faults in the program source, or incorrect user application. The most common anomalies that you may occasionally note are:

A flutter effect, dropout effect (similar to audio tape dropout heard on reel-to-reel or cassette), or a roughness or hardness on some high frequency information.

These anomalies are created by post-production mixing or processing. In addition, electronic effects used in the studio can sometimes 'fool' the Composer which is only acting as instructed. Because the TATE DES essentially operates faster than the human ear can detect and assimilate information, most of the anomalies can be heard in the original source and are enhanced by the separation of the Composer. Many so-called 'decoding' anomalies can be heard when listening in stereo!

When in doubt, consult the directional display. If the display indicates an 'event' is occurring at the same time that you are hearing an 'anomaly', it can usually be traced to improper set-up in the system, or a fault in peripheral equipment, or as previously discussed, in the program source itself. The display is sampling directional signals prior to enhancement.

Excessive compression, expansion, phase shifting, polarity reversals, etc., can all create decoding errors in program sources, as well as in 'off the air' FM stereo signals. Equalizers, compressors, and expanders, ahead of the Composer in your system can also create such problems.

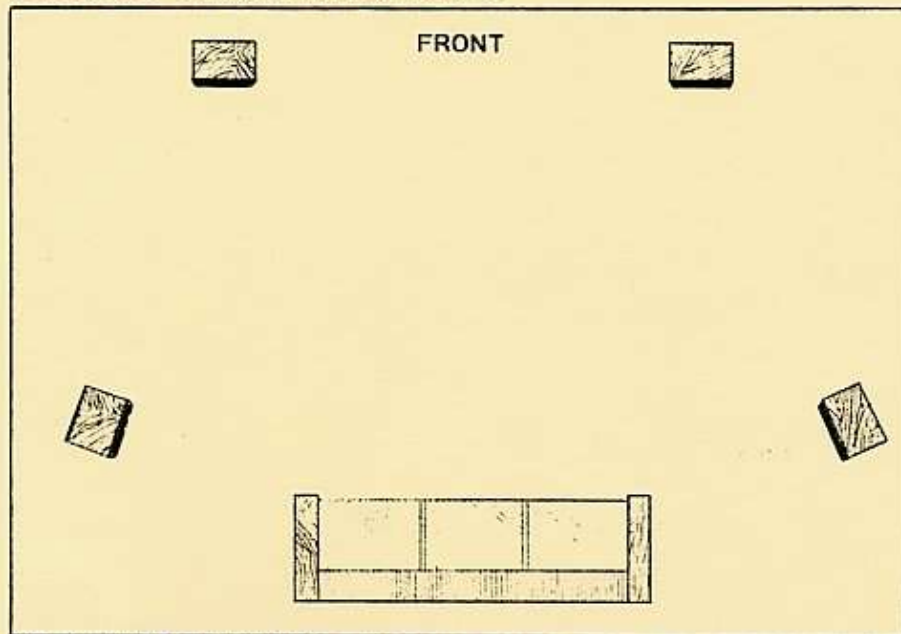
If you experience consistent anomalies in the decoding process, install the Composer less any accessory items and verify the basic performance of the system. Then insert accessories one unit at a time to isolate the peripheral unit that may be creating the anomaly.

**Tape Playback.** The Composer will have no difficulty decoding a properly recorded tape of either a stereo or SQ encoded program source provided:

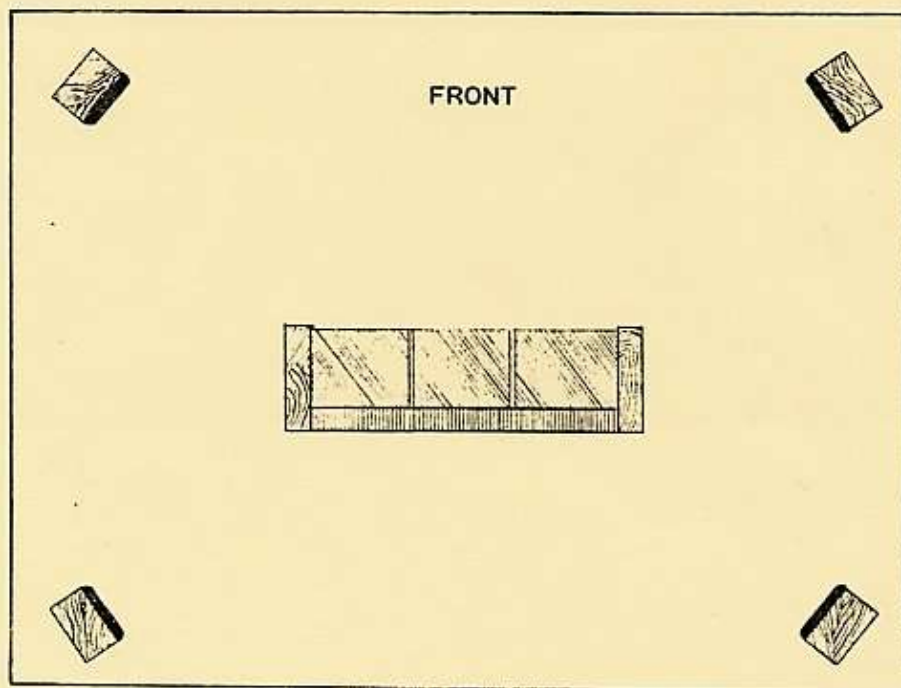
The heads of the machine are clean and kept demagnetized  
The heads of the machine do not have excessive wear  
The alignment of the playback machine matches that of machine  
which made original recording

The Dolby Noise Reduction System\* is compatible for use with the Composer.

## SUGGESTED SPEAKER PLACEMENTS



**270 DEGREE SURROUND:** "HORSESHOE SURROUND" PROVIDES THE MOST NATURAL LISTENING PERSPECTIVE, WHEN LISTENING TO STEREO ENHANCE OR NON-SURROUND (CONVENTIONAL) SQ RECORDINGS. THIS CONFIGURATION IS USUALLY EASIER TO FIT INTO THE COMMON LIVING ROOM DECOR THAN "FULL SURROUND".



**360 DEGREE "FULL" SURROUND:** THIS PLACEMENT IS BETTER SUITED TO "SURROUND" TYPE SQ RECORDINGS, WHERE THIS LISTENING POSITION WAS INTENDED FOR PROPER PLAYBACK PERSPECTIVE. WHILE SPECTACULAR, IT WILL TEND TO "STRETCH" STEREO ENHANCED IMAGES AND CONVENTIONAL SQ RECORDINGS TO AN UN-NATURAL STAGE WIDTH. THIS PLACEMENT IS ALSO HARDER TO BLEND INTO SOME LIVING ROOM ARRANGEMENTS.

THESE SUGGESTED PLACEMENTS ARE BY NO MEANS THE ONLY ONES WHICH WILL YIELD THE DESIRED EFFECT. MANY PEOPLE MUST ADJUST TO FIT THEIR PARTICULAR SITUATIONS. MOUNTING THE SPEAKERS AT EAR LEVEL (AT THE LISTENING POSITION) IS RECOMMENDED, IF POSSIBLE.

**DIRECTIONAL DISPLAY.** The multi-function directional display on the front panel of the Composer can be very helpful in setting up the Composer, or evaluating the source material. When there is no input signal (or very little), only the Peak/Pilot Indicator will be illuminated, indicating that the Composer is on (Pilot Light). When minimum input signal is present at the input jacks, and with the input level control adjusted, the Pilot Light extinguishes and the Directional Display is activated. The six triangular indicators show directionality being derived from the input program material. When the Directional Display and the Peak/Pilot Indicator are illuminated simultaneously, the Center Amber indicator is a Peak Input Overload indicator. The optimum input signal is as close to peaking as possible, but with only intermittent flashes of the peak indicator. The display components are labeled on the opposite page. When the Solo Null function is engaged, it is indicated by a steady Center Front indication on the Directional Display.

### SPEAKER PLACEMENT

Described below are two of the most popular, and effective, speaker placements for quadraphonic sound. In some instances, placement is restricted by room size, shape and furnishings. Within reason, these placements can be adjusted to meet the needs of the listener.

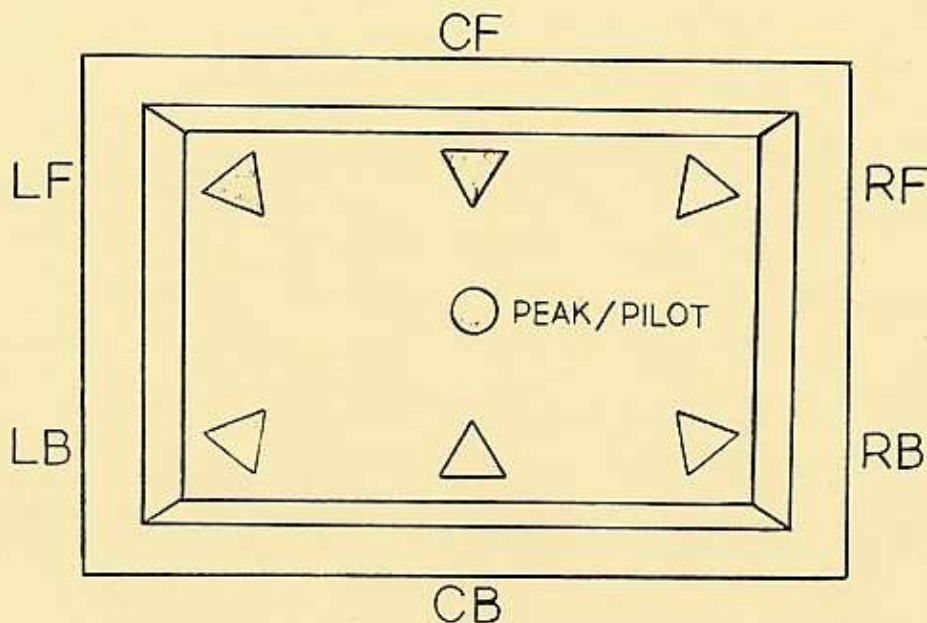
**270 Degree Surround.** To many listeners, this is the most natural sounding, in that it presents a horseshoe shaped staging. This provides a 'front row center' perspective. If you prefer a perspective a bit more distant, retain the speaker configuration but move them closer together away from the listening area, but not so close as to totally collapse the sound field. A sense of spaciousness will be retained, but it will not be as dramatic.

**360 Degree Full-Surround.** This placement is more 'exciting' than '270 Degree Surround' because of the greater separation of the speakers. Ambient effects are dramatic. This arrangement is better suited to Rock and Electronic music and properly encoded SQ records. Symphonic music listeners will usually prefer the 270 Degree Surround format.

A final note about speaker placement. Results will be enhanced in any configuration if the loudspeakers are radiating towards you at a height slightly above ear level (6-12"). Voices and solo instruments are 'staged' lifesize.

### SUMMARY

1. The Composer should be placed in a well ventilated area, as some heat is generated by the Class A circuitry. To conserve energy, we recommend turning the unit off when not in use.
2. When utilizing the Solo Null mode, better cancellation can sometimes be achieved by rotating the Separation Control CCW a small amount.
3. A slight audible noise is often present when the Composer is turned on and off. This is normal and inherent in the design of the Directional Enhancement System.

DIRECTIONAL DISPLAY:

**DIRECTIONAL INDICATOR:** THESE INDICATORS ILLUMINATE TO SHOW INTENDED DIRECTIONALITY AS WELL AS MOVEMENT, AND SOUND FIELD DISTRIBUTION.



**PEAK/PILOT INDICATOR:** THIS INDICATOR SERVES AS A PILOT LAMP, UNDER NO SIGNAL CONDITIONS, DURING WHICH THE DIRECTIONAL INDICATORS ARE "BLANKED", OR TURNED OFF, AND ALSO AS A "PEAK" INDICATOR, UNDER INPUT OVERLOAD CONDITIONS.

WHEN NO SIGNAL IS PRESENT AT THE COMPOSER'S INPUT JACKS, THE DIRECTIONAL DISPLAY IS BLANKED (TURNED OFF), AND THE PEAK/PILOT INDICATOR IS ILLUMINATED TO INDICATE POWER "ON" (PILOT).

WITH THE PROPER INPUT SIGNAL LEVEL PRESENT AT THE INPUT JACKS OF THE COMPOSER, THE PILOT WILL EXTINGUISH (TURN "OFF"), AND THE DIRECTIONAL DISPLAY WILL BECOME ACTIVE.

CF= CENTER FRONT

CB= CENTER BACK

LF= LEFT FRONT

LB= LEFT BACK

RF= RIGHT FRONT

RB= RIGHT BACK

WHEN THE PEAK/PILOT INDICATOR ILLUMINATES WHILE THE DIRECTIONAL DISPLAY IS ACTIVE, INPUT OVERLOAD MAY BE OCCURRING, AND INPUT LEVEL SHOULD BE REDUCED.

PROPER INPUT LEVEL IS INDICATED BY AN ACTIVE DIRECTIONAL DISPLAY WITH THE PEAK INDICATOR FLASHING ONLY INTERMITTANTLY ON PROGRAM PEAKS. THIS ALLOWS FOR ENOUGH LEVEL TO ACHIEVE A RESPECTABLE SIGNAL TO NOISE RATIO, BUT NOT SO MUCH INPUT SIGNAL THAT THE DYNAMIC RANGE OF THE PROGRAM MATERIAL IS LIMITED.

4. Due to the variability of recordings, slight re-adjustment of the Input Balance Control and the Separation Control may be necessary to minimize audible decoding action. Just as aperture and focus requirements change from photo to photo in photography, the Composer may require slight adjustment changes from recording to recording. Whenever the source (tuner, phono or tape) is changed, the Input Balance should be re-checked.

5. DO NOT attempt to adjust any internal potentiometers or controls other than those specifically identified as a user control in this manual. A calibration fee will be charged for any Composer returned to the factory with controls giving evidence of tampering.

6. Before attempting to utilize the accessory interface of the Composer, contact the factory for information vital to its use. Damage to Composers caused by improper use of the accessory interface will void the warranty.

7. Save all packing materials in the event that you must return the Composer to the factory for service. A return authorization number is required. Contact the factory for this number.

8. We encourage users to let us know of any alternate uses for the Composer. We are interested in hearing from owners regarding interesting program material. We request the information in writing rather than by telephone.

Thank you for your choice of our products.

#### Trademark Credits

SQ is a tm of CBS, Inc.  
Dolby System is a tm of Dolby Laboratories, Inc.  
TATE DES is a tm of TATE Audio Ltd.  
QS is a tm of Sansui Electric Corp.  
CD-4 is a tm of Japanese Victor Corp.  
Space & Image Composer and Composer are tms of Audionics, Inc.  
Audionics of Oregon is a tm of Audionics, Inc.

TROUBLESHOOTING GUIDE

**SYMPTOM:** NO INDICATION OF POWER "ON" (PILOT).

**CHECK:**

1. Power switch not turned "ON".
2. Is the Composer plugged in?
3. Are the fuses intact?
4. Is the display cable (internal) intact?
5. Is the wall (mains) socket active?

**SYMPTOM:** UNABLE TO OBTAIN ANY DISPLAY BUT PILOT.

**CHECK:**

1. Input Level control not turned up.
2. No source audio present at input jacks.
3. Check all input cabling.
4. Wrong source selected on preamp/receiver.
5. Check tape monitor switching.

**SYMPTOM:** UNABLE TO ATTAIN "PEAK" INDICATION.

**CHECK:**

1. Not enough input level.
2. Input Level control turned down.
3. Check input cabling.

**SYMPTOM:** INCORRECT DISPLAY ON DECODING CHECK.

**CHECK:**

1. Phase reversal in the source (usually cartridge).
2. Stereo Enhance mode selected instead of SQ mode.
3. Solo Null switch still in "Null" position.
4. Excessive Compression/Expansion before Composer.
5. Defective cartridge.
6. Display taken too "literally".

**SYMPTOM:** AXIAL TILT ACTION MINIMAL OR NONEXISTANT.

**CHECK:**

1. Internal Switch on "Bypass" (applies to stereo only).
2. Already aligned cartridge (No error = No correction).
3. Have the Axial Tilt controls been calibrated?

**NOTE:** THE CONTROLS FOR OUTPUT BALANCE (3), SEPARATION (1) AND OUTPUT LEVEL (1) ARE DC OPERATED CONTROLS. A LITTLE NOISE MAY BE EXPERIENCED FOR THE FIRST FEW MINUTES OF OPERATION IF THESE CONTROLS ARE ADJUSTED DURING THE "WARM-UP" PERIOD. A SLOW TURN-ON CIRCUIT BRINGS THE UNITS OPERATING VOLTAGE UP TO THE PROPER LEVEL SLOWLY TO AVOID EXCESSIVE TURN-ON TRANSIENTS. UNTIL THE DC OPERATING LEVEL HAS STABILIZED, CONTROLS SHOULD NOT BE RADICALLY ALTERED UNTIL THIS WARM-UP PERIOD HAS PASSED. THANK YOU!

ANY PROBLEM NOT TRACEABLE TO THE ABOVE SUGGESTED CHECKS, CABLING, FUSING, OUTBOARD ASSOCIATED EQUIPMENT, OR OPERATOR FATIGUE WILL MOST LIKELY REQUIRE SERVICE. CONSULT YOUR DEALER OR THE FACTORY.