

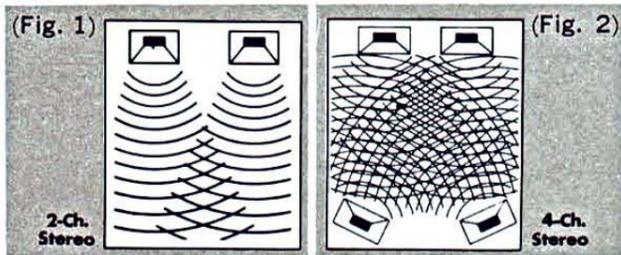
# 4-CHANNEL REAR AMPLIFIER **SANSUI QS500**



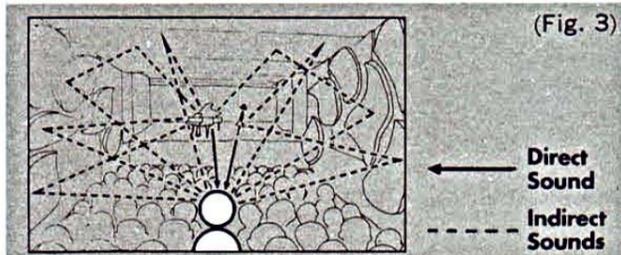
**SANSUI QS-500 4-CHANNEL REAR AMPLIFIER** You're looking at what has to be the best bet yet for 2-channel stereo owners with 4-channel ambitions. It's the all-new Sansui QS-500 4-Channel Rear Amplifier—a feature-packed power amplifier/4-Channel Synthesizer Decoder combination designed to let you parlay your present 2-channel system into a thoroughbred 4-channel system. Overnight. And to do so with maximum economy. Here's what you get: a powerful 120 watt high-performance power amplifier *plus* Sansui's unique 4-Channel Synthesizer Decoder. And here's what it means to you: instant capability for converting your present 2-channel tapes, discs (and FM stereo broadcasts) into the immensely richer 4-channel format. The result is a very, very

close approximation of vibrant sound fields as they are experienced at live performances, with all the same liveliness and excitement. With the QS-500, you need only add a second set of speaker systems to your present setup, and you're off and running. And the effect is even more overwhelming when you hear two-channel records, tapes and FM stereo broadcasts encoded from four channels by the Sansui 4-Channel Encoder. Another attractive feature of the QS-500 is that it provides for recording and playing 4-channel stereo tapes should you already own or plan to buy a 4-channel stereo tape deck. The Sansui QS-500. A brilliantly-engineered component that carries you in one giant step into the new, breathtakingly beautiful world of 4-channel sound.

**THE SANSUI QS-500 4-CHANNEL REAR AMPLIFIER AND 4-CHANNEL STEREO:** Four-channel stereo is the most advanced means yet devised of faithfully reproducing an original sound field. Two-channel stereo has reached the limit of its potential in this respect, restricted as it is to merely reproducing sound sources points (Fig. 1). By moving up to 4-channel stereo with the Sansui 4-Channel Rear Amplifier QS-500 you are not merely doubling the stereo effect as you might suppose, but rather you are multiplying the effect many fold to approximate a sound field as it would be experienced in a concert hall (Fig. 2). In other words, you are moving from a sound sources point method of reproduction to the reproduction of an entire sound field. This is made possible by the Sansui QS-500's capability of handling reflected or indirect sound, in addition to direct sound, as an independent sound source.



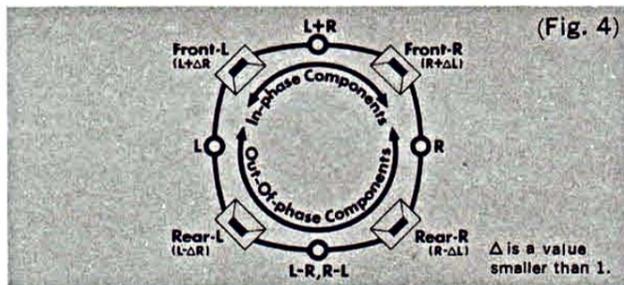
**SOUND FIELD:** By sound field we mean *all* of the sounds that you are exposed to in a live performance—not only those coming directly from a stage—but those far more numerous indirect sounds which are reflected by the ceiling, walls, floor and furnishings as well (Fig. 3). The extra set of speaker systems in the 4-channel stereo format gives the resources needed for reproducing a great deal more of such sounds and to approximate for the first time a sound field in the living room. Besides the second pair of speaker systems, you need only add the QS-500 to your present 2-channel system to achieve the new 4-channel stereo system. And while it may be a few more years before standardized 4-channel stereo records and



FM broadcasts become available, the QS-500 offers the immediate advantage of converting existing 2-channel program sources to the new

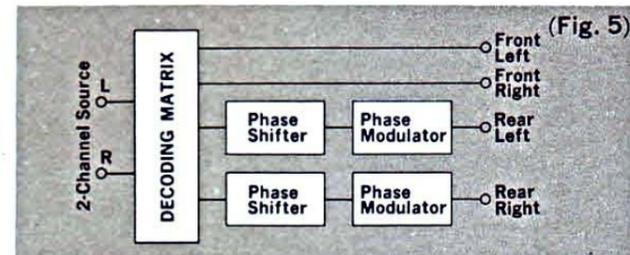
4-channel format. This is done by letting the second pair of speaker systems take over much of the sound burden formerly borne by one pair alone. The two pairs are then repositioned so that indirect sounds and extreme end sounds are processed through the QS-500's decoding matrix before being emitted through the rear speaker systems, for a remarkable increase in liveliness and presence.

**HOW THE QS-500 WORKS.** The QS-500 more closely approximates such a sound field than any other system yet devised. It accomplishes this by singling out indirect sound components from 2-channel sources by the use of the Sansui-developed QS decoding matrix, shifting their phases to achieve complete 2- to 4-channel conversion, then finally modulating their phases anywhere from 0 to 180 degrees to create the apparent effect of emitting sound from numerous directions (Fig. 4). This results in a revolutionary increase in the sense of 'presence', giving you the same feeling you'd experience at a live performance. Further, if you were to reproduce 2-channel discs recorded with a 4-channel encoding matrix, the decoding matrix would separate the two channels back into the original four channels, enabling each speaker system to establish distinct sound images of the particular sound sources assigned to it during the original 4-channel recording session. We call this capability of the QS decoding matrix to separate 'encoded' 2-channel material back into four channels its decoding function.

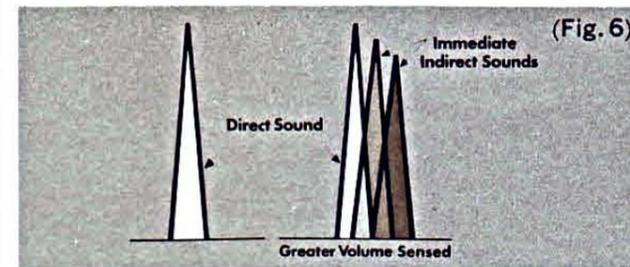


**QS DECODING MATRIX:** This is the first step on the way to converting 2-channel sound sources into the immensely richer sound of 4-channel stereo. To understand it fully, imagine an orchestra on stage. The two recording microphones in 2-channel stereo are normally spaced on either side of the center of the stage. Because of the limitations of this 2-point pickup arrangement, all the direct sounds (those which reach the microphones directly), indirect (those reflected by walls, ceiling, floor, etc., before reaching the microphones) and direct independent (those produced at the extreme ends of the stage) are randomly mixed and delivered as

lump left and right channel signals. Sansui's QS decoding matrix takes these lump signals and reorganizes them. Now instead of having a mixture of direct, direct independent and indirect sounds, there is a separation of these components. The direct sounds are sent ahead for reproduction by the front channels, while the independent and indirect sounds are phase-shifted to render them identical in phase and establish clear sound images in the rear channels as well. These sounds are then phase-modulated and reproduced from the rear speaker systems (Fig. 5). This, we call the sound field synthesizing function of the QS decoding matrix.



**PHASE MODULATION:** As the illustration shows, the QS-500 takes the rear channel sound components—shown here as a regular pulse form—and through its unique process of phase modulation, gives it increased depth and richness without requiring an increase in power. The principle is easy enough to understand: As the rear channel sound components are phase-modulated from 0 to 180 degrees, sounds come out of the rear speaker systems with minute phase differences. This means, as Fig. 6 shows, the sense of sound volume dramatically increases, especially expanding the dynamic range of percussive sounds. Simultaneously, since the rear channel sounds now arrive at the listener's ear with fine time delays, the end effect very closely approximates the acoustic effect present in an actual concert hall where the original sounds are reflected by the walls, floor, ceiling etc. and converge upon the listener's ear with various time delays. This gives us a great increase in 'presence', and is the most important aspect of the 4-channel stereo effect made possible by the QS-500.



**SPECIFICATION**

**POWER AMPLIFIER SECTION**

**POWER OUTPUT**

**MUSIC POWER (IHF)** 120W at 4Ω load  
90W at 8Ω load  
**CONTINUOUS POWER** 40/40W at 4Ω load  
33/33W at 8Ω load

**TOTAL HARMONIC DISTORTION**

less than 0.5% at rated output

**INTERMODULATION DISTORTION**

(60Hz: 7,000Hz=4:1 SMPTE method)  
less than 0.5% at rated output

**POWER BANDWIDTH (IHF)** 20 to 40,000Hz

(at normal listening)  
**FREQUENCY RESPONSE** 20 to 50,000Hz ±1dB

**CHANNEL SEPARATION** better than 60dB

**HUM AND NOISE (IHF)** better than 80dB

**LOAD IMPEDANCE** 4 to 16Ω

**DAMPING FACTOR** 24

**CONTROLS**

**VOLUME LEVEL SET**  
**FRONT BALANCE (LEFT-RIGHT)**  
**REAR BALANCE (LEFT-RIGHT)**  
**MAIN BALANCE (FRONT-REAR)**

**SWITCHES**

**SYNTHESIZER/DECODER** 2-CHANNEL, CONCERT HALL-1, CONCERT HALL-2, SURROUND  
NORMAL, QUARTER-TURN, HALF-TURN DECODER  
**TAPE MONITOR (2-CHANNEL)** SOURCE, PLAY BACK  
(4-CHANNEL) SOURCE, PLAY BACK  
**POWER/SPEAKER** POWER OFF, SYSTEM-A, SYSTEM-B, SYSTEM A+B.

**SYNTHESIZER SECTION**

**INPUT LEVEL**  
**RATED INPUT (2-CHANNEL)** 0.15V (50KΩ)  
**MINIMUM INPUT (2-CHANNEL)** 0.05V (50KΩ)  
**TAPE MONITOR (2-CHANNEL)** 0.15V (50KΩ)  
(4-CHANNEL) 0.775V (50KΩ)

**OUTPUT LEVEL**

**RATED OUTPUT (OVU) (4-CHANNEL)** 0.775V (to Front Amplifier)  
**MAXIMUM OUTPUT (4-CHANNEL)** 5.0V (to Front Amplifier)  
**RECORDING OUTPUT (2-CHANNEL)** 0.15V  
(4-CHANNEL) 0.775V

**FREQUENCY RESPONSE**

**FRONT CHANNEL** 20 to 20,000Hz ±1dB  
**REAR CHANNEL** 20 to 20,000Hz ±1dB

**SYNTHESIZATION OF REAR CHANNEL SIGNAL**

**1 NEW SANSUI'S MATRIX SYSTEM**  
**2 PHASE MODULATION SYSTEM**

**REAR CHANNEL PHASE SHIFT**  
(LEFT) 90 degree at 300Hz  
(RIGHT) 90 degree at 600Hz

**REAR CHANNEL PHASE MODULATION**  
Max. 180 degrees at 10,000Hz (by Sansui's phase modulation system)

**HUM AND NOISE (IHF)** better than 70dB

**GENERAL**

**SEMICONDUCTORS**  
Transistors: 37 Diodes: 12 IC: 1 Modules: 7  
Zener Diodes: 2

**POWER REQUIREMENTS**

**POWER VOLTAGE** 100, 110, 117, 127, 220, 230, 240, 250.

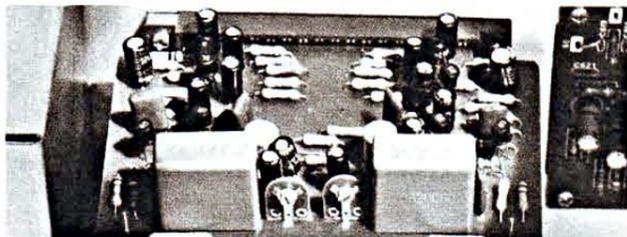
**POWER CONSUMPTION** 205W (max. signal)

**DIMENSIONS**

382mm(15 1/8")W x 162mm(6 3/8")H x 337mm(13 3/8")D

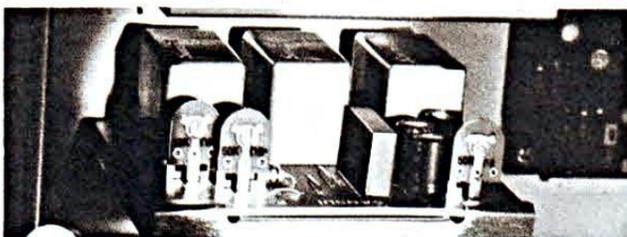
**WEIGHT** 10 Kg (22 lbs).

**CONVERTS TWO-CHANNEL MATERIAL INTO FOUR CHANNELS:** By a mere turn of the Function Selector on the QS-500, conventional 2-channel program source material is instantly converted into 4-channel material by this section. The Synthesizer Decoder section can also re-convert encoded 2-channel material back into four channels. This differs from 2-channel stereo in that the original recording was made for four channels, and then condensed into the 2-channel format by an encoder. Played through the QS-500, this material is then re-converted back into its original 4-channel format.



**PHASE SHIFTER CIRCUIT:** This circuit takes the now decoded rear channel signals and shifts their phases to establish a correct phase relationship between the rear left and right channels.

**EXCLUSIVE PHASE-MODULATOR CIRCUIT:** This circuit, exclusive with Sansui (patents pending), modulates the phase of the rear channel signals to give them the same randomly varying phase differences as would be experienced in any live performance.



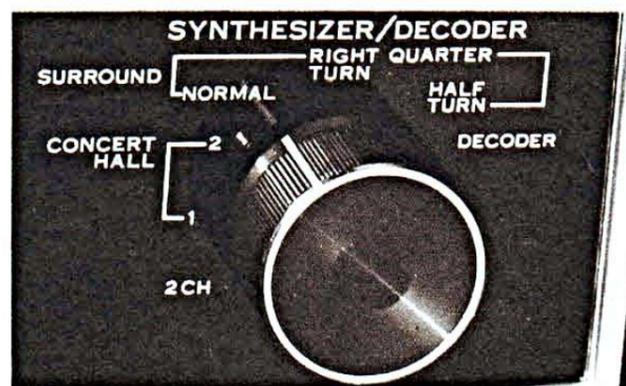
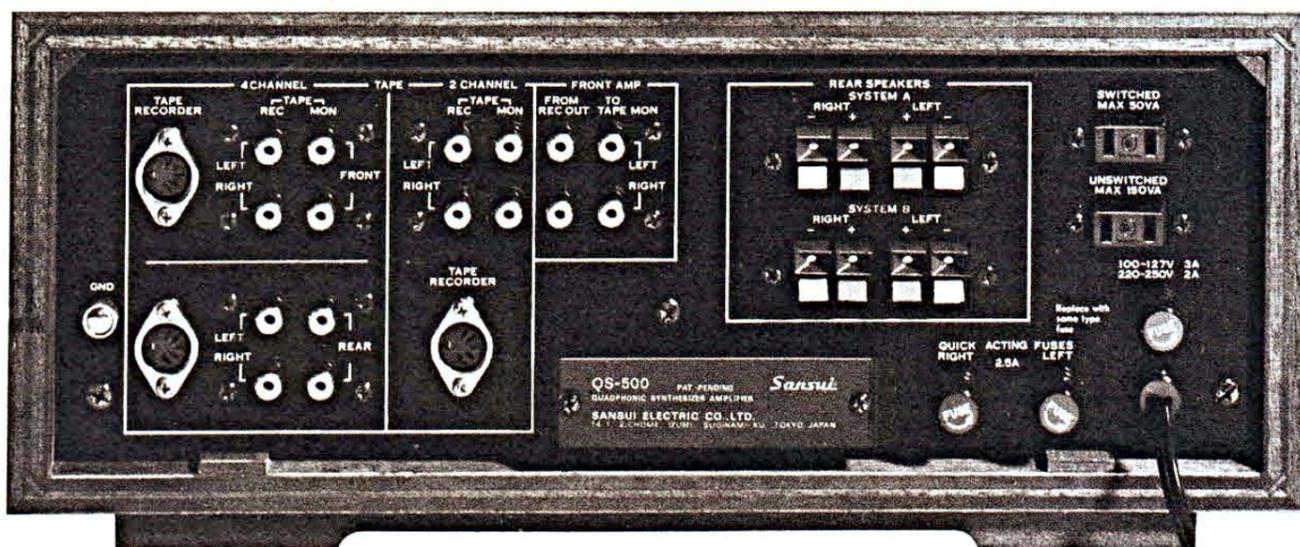
**ALL-ELECTRONIC CIRCUITRY:** The entire 4-Channel Synthesizer Decoder section is constructed as an all-electronic printed circuit board containing special Sansui-developed integrated circuits (ICs) among others. Since no mechanical echo or time-delay devices are used, the resulting sound is quite natural and the tonal quality is not impaired whatsoever. Any echo or reverberation you may detect is contained in the original recording, since nothing of that nature is artificially added.

**POWERFUL, ENTHRALLING SOUND EFFECT:** The interaction in the air of the sounds omitted by the four speaker systems creates an enthralling, powerful sound effect. The 'texture' of the sounds, their transient response and dynamic range are immensely improved when compared to 2-channel stereo sound, so that even a relatively compact set-up is able to render a sound effect more powerful than a 2-channel system several times bigger.

**SUITS ANY TAPE MONITOR-EQUIPPED SYSTEM:** If you already own a 2-channel music system, amplifier or receiver equipped with a tape monitor circuit (tape monitor and record terminals), you're all set for the 'next-generation' stereo. For the QS-500 can be connected to any amplifier, receiver or music system having such a circuit.

**VERSATILE 7-POSITION FUNCTION SELECTOR:** Whatever your favorite music might be, from the 'now sound' of electronic music to popular vocals to big band jazz to classics—the QS-500 is ready to render it better. To facilitate exploring the unique aspects of these different types of music, it is equipped with a versatile 7-position Function Selector. Simply set it to the position appropriate for the type of music you wish to hear.

**2 CHANNEL:** For regular 2-channel stereo sound from the front speaker systems only. By a



simple turn of the selector, you can also compare 2- and 4-channel stereo sounds.

**CONCERT HALL 1:** For orchestras and big-band jazz. Suitable for most purposes. Both the front and rear channels are amplified flatly.

**CONCERT HALL 2:** For solo performances, vocal numbers and other small-band selections. Concert hall effects are exaggerated.

**SURROUND-NORMAL:** Suitable for programs which sound most effective with the musical instruments scattered throughout the room, such as popular music, mood music, Moog sound and rock 'n roll.

**SURROUND-QUARTER TURN:** For the same surround effect, but with sound turned around by 90 degrees counterclockwise. Use to obtain a normal 4-channel stereo effect when hearing vocal or other types of programs where sound is loud only on the right side.

**SURROUND-HALF TURN:** For the same surround sound effect, but to turn sound around by 180 degrees, so that the front sound will be heard from the rear speaker systems. Used with vocal numbers, this position gives the listener the feeling he is right on stage with his favorite artists.

**DECODER:** Use to 'decode' 2-channel programs (records, tapes and FM stereo broadcasts) encoded from four channels by the newly developed Sansui 4-Channel Encoder. This restores them to their original 4-channel stereo format for your listening pleasure.

**2- AND 4-CHANNEL TAPE MONITOR CIRCUITS:** The QS-500 is equipped with terminals—both pin jack type and a DIN connector socket—for connecting a 2-channel tape deck as well as 4-channel tape deck. Recording and playback are easily accomplished with either.

**FOUR LARGE VU METERS:** Four large professional VU meters facilitate setting the input signal strength to an appropriate level to protect the set from excessively large input signals.

#### POWER AMPLIFIER SECTION

**SEMI-COMPLIMENTARY ITL-OTL AMPLIFIER:** The power amplifier incorporated in the QS-500 to drive the rear-channel speaker systems adopts a sophisticated semicomplementary Darlington ITL (input-transformer-less)-OTL (output-transformer-less) design. It affords exceptional output characteristics, such as a music power output of 120 watts (at 4-ohm load, IHF), continuous power of 40 watts per

channel (at 4-ohm load), total harmonic distortion of less than 0.5%, and a wide power bandwidth of 20 to 40,000Hz. And there's nothing gimmicky behind those figures. Just painstaking Sansui quality engineering, careful choice of parts (especially silicon transistors), and the traditional craftsmanship you'd expect from an audio-only manufacturer with over 25 years' experience.

**COMPLETE TRANSISTOR PROTECTION:** The all-important power transistors are very carefully protected in the amplifier. For in addition to having been very carefully selected and tested to meet extremely stringent standards both electrically and physically, the amplifier adopts a circuit design that minimizes the possibility of damage to them. It is also equipped with huge heat sinks and special quick-acting fuses to doubly insure their safety.

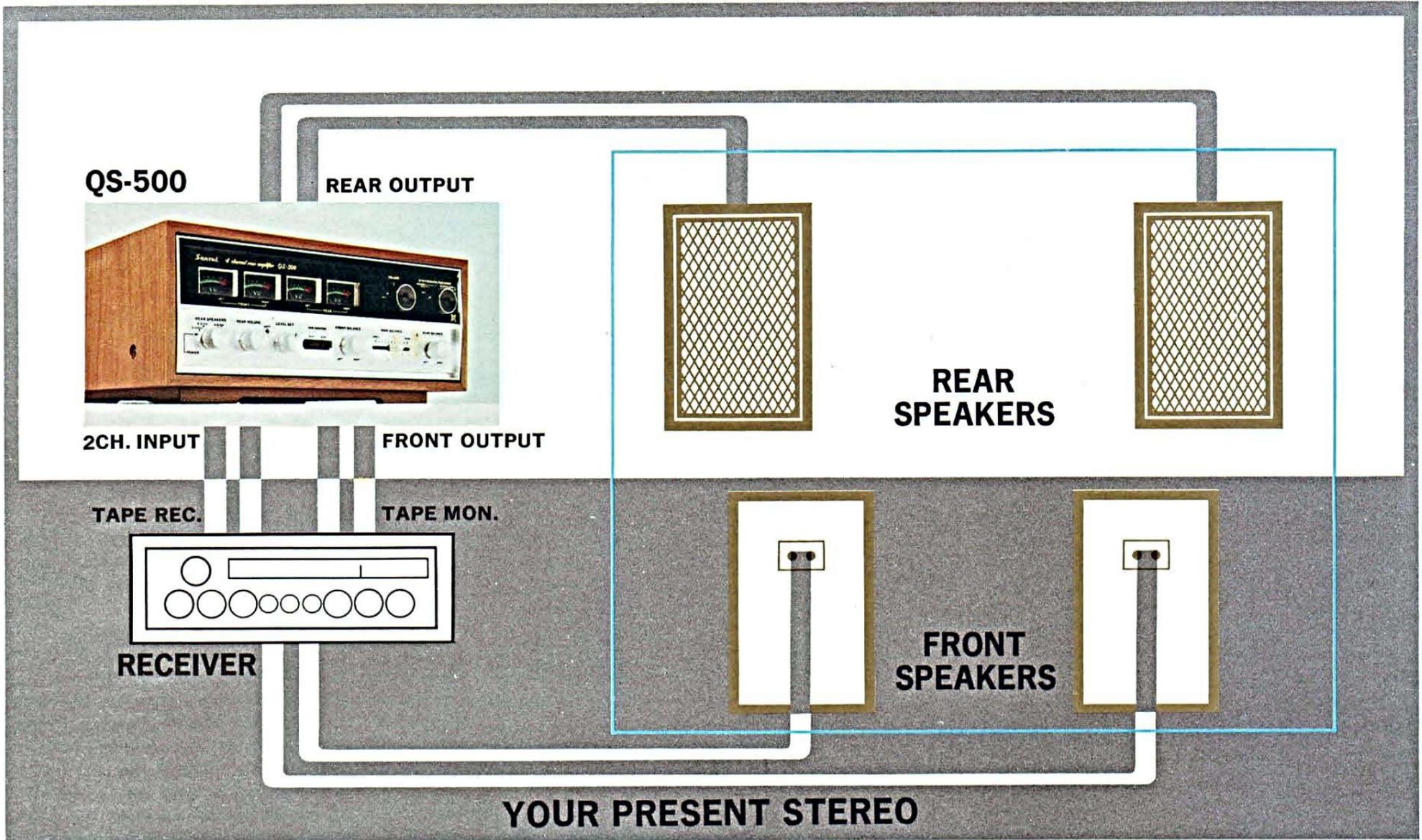
**CHOICE OF TWO REAR SPEAKER POSITIONS:** Whether you prefer to experience stereo surrounded by the four speaker systems (the '2-2 System') or would rather 'face the music' as you would do in a concert hall (the 'Front 2-2 System'), the QS-500 is ready to oblige. Complete with a speaker switch, it lets you choose either position for the rear speaker systems, or a third position combining both should you prefer that kind of arrangement.

**SOPHISTICATED PROFESSIONAL APPEARANCE:** The QS-500 is styled after Sansui receivers, recognized the world over for their solid quality performance and elegant appearance. Its front panel is of two-tone silver-and-black design, with the upper half turning completely black when a 2-channel performance is in progress. And the entire unit is housed in a luxurious walnut-grained wooden cabinet.

**COMPLETE SYSTEM OF CONTROLS:** The QS-500 is complete with these other convenient controls: Four-gang master volume control for adjusting the sound volume in all four channels simultaneously and independently of the four VU meters; easy-to-use sliding front-and-rear channels balance control; separate balance controls for the front left and right, rear left and right channels; level set control for adjusting the input signal strength to an appropriate level and avoiding excessively large input signals which could result in distortion, and an output level control to facilitate matching the output signal strength to that of the front-channel amplifier.

**TWO CONVENIENT AC OUTLETS:** These permit connecting other equipment in your 4-channel stereo set-up, such as the front-channel amplifier or tape decks. One of them is controlled by the front-panel power switch.

**FOOLPROOF ONE-TOUCH SPEAKER TERMINALS:** Connection of speaker systems to the QS-500 is made effortless by the adoption of Sansui's unique one-touch connection terminals. They eliminate the possibility of short-circuits.



### CONNECTING YOUR QS-500

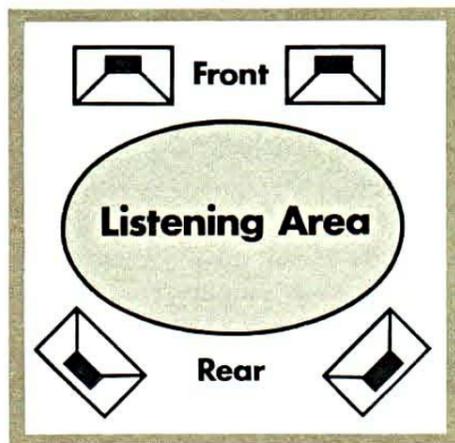
As the illustration above indicates, getting your QS-500 ready for business is a simple matter. You merely connect the tape recording terminals of your present receiver with the input terminals on the QS-500's rear panel. Then feed the front-channel outputs of the QS-500 to the receiver's tape monitor terminals. Your present set of speaker systems are

then connected to the receiver, while a second (rear channel) set are connected to the speaker terminals of the QS-500. You can also connect both a 2-channel and a 4-channel tape deck directly to the QS-500 if you so desire, while a tuner or turntable can be connected to the receiver. It's just that easy to get into the heady new world of 4-channel stereo.

### POSITIONING SPEAKER SYSTEMS

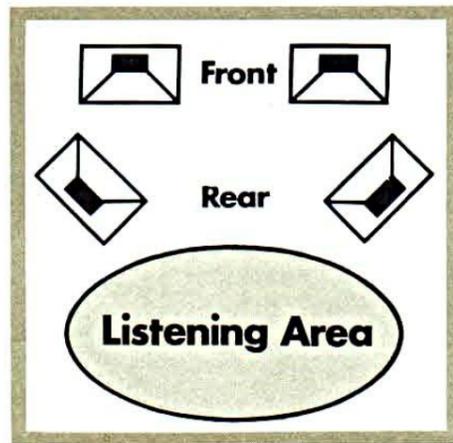
This is a very important aspect of the entire new format. Speaker positioning can do much to determine just how you can exploit your new system to maximum advantage. Here are four different possibilities:

#### 2-2 system



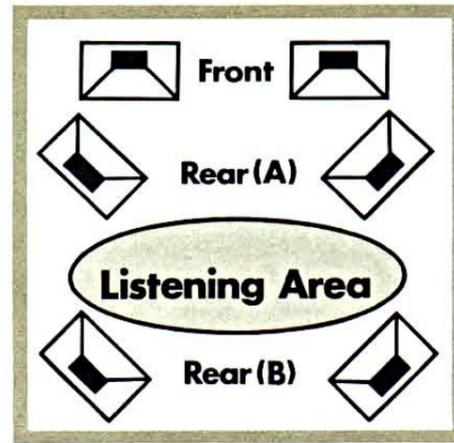
**2-2 System:** Regular 4-corner position widely accepted as "standard". Most effective for listening to mood music, rhythm and blues, vocal numbers and "recorded-live" records.

#### Front 2-2 system

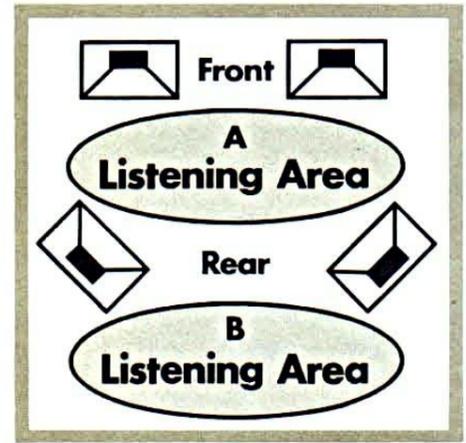


**Front 2-2 System:** Best for symphonies, operas, chamber music and big band jazz.

#### 2-2/Front 2-2 compatible systems



**Ideal Positioning Method:** Involves the use of six speaker systems and lets you choose the regular 2-2 or front 2-2 system by the simple changeover of the Speaker Switch on the QS-500.



**2-2 / Front 2-2 Compatible Positioning Method:** With the rear speakers placed as shown here, you're able to enjoy both the regular 2-2 system and the Front 2-2 system by moving from point A to point B.

**Note:** Whatever your preference, better effect can be obtained by placing the front two speaker systems on the floor slightly in from the extreme left and right corners of the room, and by elevating the rear systems about three feet off the floor.