

4-CHANNEL RECEIVER

SANSUI QRX6500



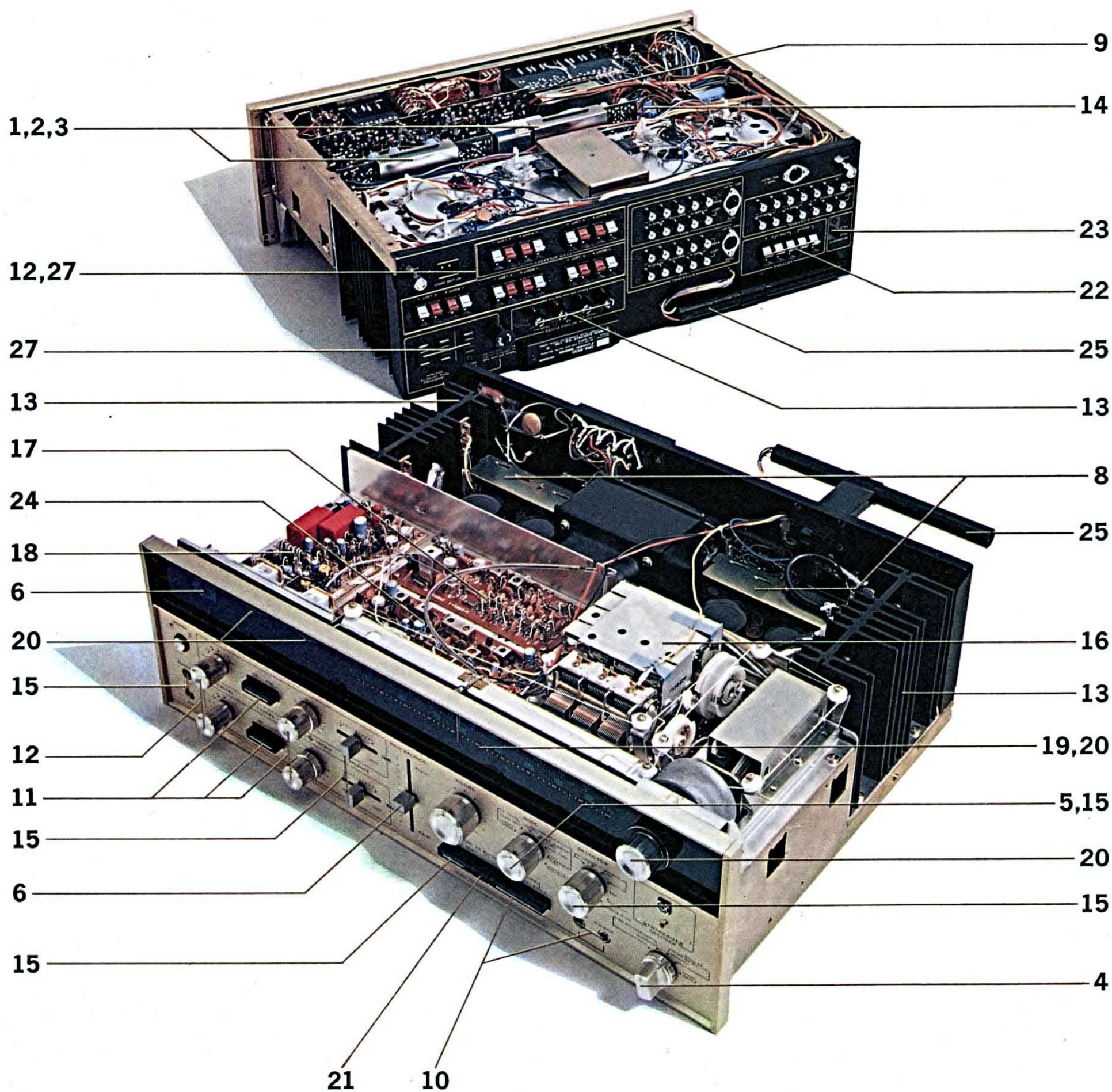
QS REGULAR MATRIX
4 CHANNEL STEREO

SANSUI QRX-6500 4-CHANNEL RECEIVER This is the new Sansui QS regular matrix 4-channel receiver with ingenious Vario-Matrix circuitry for increased separation and improved 4-channel sound field reproduction. Incorporating all the acclaimed features of the legendary QR-6500, the new QRX-6500 goes this famed unit one step better by taking the matrix 4-channel system to perfection. It is, first of all, a combined 280 watt 4-channel amplifier, extremely sensitive FM/AM stereo tuner and the new QS regular matrix decoder. But then it is also the most advanced means yet devised of faithfully reproducing an original sound field in 4-channel, while it retains the capability of decoding and reproducing all the significant 4-channel sources available in disc and tape today. The secret of its startling stereo separation is the Vario-Matrix circuit. In a nutshell, this circuitry takes advantage of various psycho-acoustic phenomena such as the directional masking of the weaker sound by the strongest, loudest sound when several sound arrive simultaneously at the human ears. At this time the Vario-Matrix actually controls

the matrixing parameter from moment to moment to provide sufficient the separation among the sounds—favoring the loudest sound, of course—in proportion to the difference in loudness. Or, in other words, the Vario-Matrix clearly defines each sound source to improve your 4-channel sound field reproduction. The QRX-6500 is dramatically new in other ways, too. Its exclusive built-in 2-4 Synthesizer Encoder helps the QS regular matrix system transform all 2-channel stereo records, tapes and FM stereo broadcasts more effectively into supreme 4-channel sound. Its Phase Matrix circuitry perfectly decodes all SQ system records with excellent front-rear separation. It also has an extra set of discrete 4-channel inputs for greater versatility. Summed up, what the QRX-6500 will do to your music is add inspired depth, delicate nuances and the remarkable sound field phenomenon, with outstanding separation, that characterizes all live performances. And it will do this better than any other receiver now available.

Sansui

The Sansui QRX-6500 with Vario-Matrix: Improved Sound Field Reproduction with Any 4-channel Sound Source



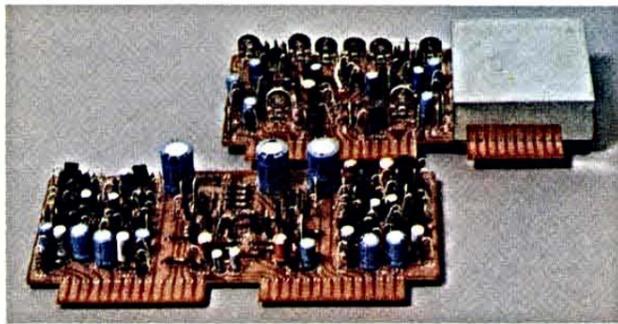
QS 4-CHANNEL SYNTHESIZER DECODER SECTION

1 CONVERTS 2-CHANNEL SIGNALS TO 4-CHANNEL:

The new QS Synthesizer in the QRX-6500 converts existing 2-channel stereo program sources to immensely richer 4-channel sound. Your available sources include records, tapes and FM stereo broadcasts. There is no need whatsoever that you obsolete your current record collection.

2 DECODES ENCODED 4-CHANNEL SOURCES:

The QS regular matrix system incorporated in the QRX-6500 decodes all 4-channel program sources made with that system. It retrieves the original total sound field signals from encoded records, tapes and FM stereo broadcasts to reconstruct the actual live performance in your music listening room.



3 FULL ELECTRONIC CAPABILITY:

The 2- to 4-channel synthesizing and decoding described above are achieved fully electronically to reproduce without change or distortion the tonal quality of the original sound. No mechanical time delay or echo device is employed. Nor the oft-used "gain control logic" that prohibits reproduction of the original musical expressions. All current standards of hi-fi sound reproduction are strictly maintained by the QRX-6500; standards of dynamic range, frequency response, distortion and signal-to-noise ratio are all completely preserved. The reproduced "sound field" is thus hardly discernible from that obtainable with discrete 4-channel tape reproduction.

4 VERSATILE FUNCTION CONTROL:

This five-position rotary control located on the front panel of the QRX-6500 lets you reproduce different types of program sources with a variety of different reproduction modes. Here are your choices:

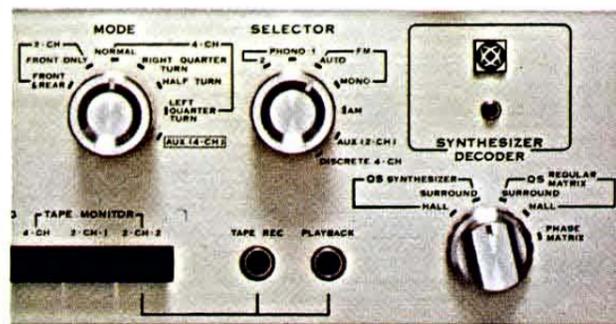
QS SYNTHESIZER-HALL: Imagine you're sitting front-and-center in a typical concert hall, and it is easier to imagine the effects of this source. You'll use it mainly to enjoy conventional 2-channel stereo sources and, when you do, the stage will be acoustically recreated in front of you, while the concert hall ambience will be in the rear.

QS SYNTHESIZER-SURROUND: You're in the middle of the music with this source, with the musicians surrounding you in such a way as to create the illusion that you are actually participating in the performance. The reproduction is an enveloping effect.

QS REGULAR MATRIX-SURROUND: Use this position to decode 4-channel program sources encoded with the QS regular matrix system. The surround effect from this source is far more prominent than from any other comparable source for two reasons: (1) there is much more acoustic information contained in such source and (2) its Square Matrix construction lets the recording engineer locate a sound source at any desired position.

QS REGULAR MATRIX-HALL: This gives you a concert-hall effect from QS-encoded 4-channel sources. With this position, however, the reproduced sound field is richer and more closely approximates the original performance since, once again, the QS-encoded 4-channel sources contain greater information.

PHASE MATRIX: This position decodes 4-channel program sources encoded with the CBS SQ system.



5 CONVENIENT MODE SWITCH:

You'll set this switch to NORMAL, RIGHT QUARTER TURN, HALF TURN or LEFT QUARTER TURN position to locate the front channel sound directly in front of you no matter which direction you may be facing. Each subsequent adjustment turns the sound around another 90 degrees. The AUX (4-CH) position is used to select a discrete 4-channel program source, such as a tape deck, connected to the AUX 4-channel inputs on the rear panel. The 2-CH positions are for reproducing 2-channel stereo sources in conventional 2-channel stereo; the FRONT ONLY position reproduces 2-channel sources from front speakers only, while the FRONT & REAR position is for reproducing the left signal from the front and rear left speakers, the right signal from the front and rear right speakers.

6 MASTER BALANCE CONTROL, DIGITAL MODE INDICATOR:

Another QRX-6500 feature is the over-all balance control between the front and rear channels. It is exceptionally easy to operate. Another convenient feature is a 2- and 4-channel digital mode indicator controlled by the Mode Switch.

7 GENEROUS INPUTS AND OUTPUTS:

The QRX-6500 boasts a complete system of inputs and outputs.

For 4-channel sound reproduction: (1) Two sets of 4-channel AUX inputs (they have different rated input voltages, and either may be used); (2) a set of 4-channel tape recording outputs and playback inputs for connecting a discrete 4-channel tape deck, and (3) a set of discrete 4-channel inputs, in that built-in order of electrical priority. An external 4-channel decoder, for example, may therefore be connected to the 4-channel AUX inputs. Additionally, if a second discrete 4-channel tape deck is connected to the discrete 4-channel inputs (3), a 4-channel recorded tape can be copied from that deck onto the one coupled to the 4-channel tape recording outputs (2).

For 2-channel reproduction: (1) A set of 2-channel AUX inputs; (2) two sets of 2-channel tape recording outputs and playback inputs, and (3) two sets of phono inputs with different input impedances. For extra convenience, both 4-channel and 2-channel tape record/playback circuits are provided with DIN sockets—two for 4-channel, one for 2-channel. Whichever program source you may choose on the front-panel SELECTOR, it is brightly indicated on the front panel in the black dial window.

4-CHANNEL AMPLIFIER SECTION

8 MIGHTY 280 WATT POWER

AMPLIFIER:

A silicon power transistor-equipped power amplifier with sophisticated semi-complementary SEPP-OTL design delivers music power of 280 watts (into 4 ohms) and continuous power of 33 watts per channel (into 8 ohms in 4-channel usage). Sansui has selected expensive transistors and advanced circuit design to keep both total harmonic distortion and intermodulation distortion below 0.5%, and to achieve a power bandwidth of from 20Hz to 30kHz. The entire amplifier is exceptionally stable even when delivering a big power output.

9 WIDE DYNAMIC RANGE:

Noise and distortion is kept to a bare minimum in the QRX-6500, thanks to the advanced equalizer amplifier. It is constructed exclusively of low-noise type silicon transistors, the better to improve the degree of transparency of reproduced sound. Consequently, the receiver's dynamic range is very wide and reproduced sound is free of distortion even when excessively large input signals pour in.

10 2- AND 4-CHANNEL TAPE MONITOR CIRCUITS:

The QRX-6500 is equipped with 2-channel tape monitor circuits (two) and a 4-channel

one. With 2-channel tape decks connected to the receiver, you'll be able to record into both decks simultaneously or reproduce tapes on either deck. Of equal significance is the QRX-6500's tape-to-tape-reprint circuit that enables the copying of tapes from one deck to another—and simultaneously monitoring them. One circuit comes with standard pin jack terminals and a DIN connector socket; the other has pin jack terminals and separate front-panel phone type jacks for recording and playback. By connecting a 4-channel tape deck, you'll have the capability to reproduce discrete 4-channel tapes or record the 4-channel signals converted from 2-channel programs by the receiver's 4-channel Synthesizer Decoder.

11 BASS, TREBLE TONE CONTROLS, HIGH, LOW FILTERS:

Separate bass and treble tone controls, as well as separate high and low filters, are featured in the control amplifier section for both the front-channel amplifiers and rear-channel amplifiers.

12 CONNECTS FIVE PAIRS OF SPEAKER SYSTEMS:

Total versatility is the keynote of the QRX-6500. It can connect up to five different pairs of speaker systems—three for the front channels and two for the rear channels. This means you can switch over between the "2-2" and "Front 2-2 System" of speaker positioning, or install four speaker systems in each of two rooms in your home.

13 BACK-UP POWER TRANSISTOR PROTECTION:

The QRX-6500 employs a safe, steady protection circuit, large heat sinks and quick acting fuses to ensure total protection of the important power transistors.

14 STABILIZED POWER SUPPLY CIRCUIT:

Distortion is minimized throughout the receiver, thanks to a stabilized power supply circuit equipped with a large power transformer and Zener diodes. This enables each circuit block to operate with unusual stability while keeping distortion to negligible levels.

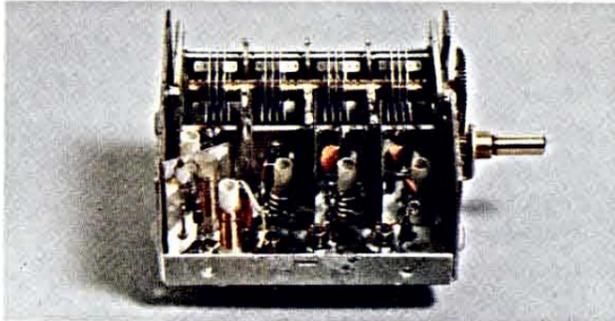
15 OTHER FEATURES:

When we say the QRX-6500 is the complete receiver, we *mean* the complete receiver. Other important features include separate pushbutton loudness controls for front and rear channels; separate headphone jacks for front and rear channels; 7-position rotary SELECTOR control for easy selection of any desired program source, and separate left-right balance controls for front and rear channels to permit hearing 4-channel stereo with perfect volume balance among the four speaker systems.

TUNER SECTION

16 SUPER SENSITIVE FM TUNER:

Utilizing three dual-gated MOS FET's (distortion-free even against an excessively large input) and a super precision 4-gang variable capacitor, the FM frontend of the QRX-6500 offers a substantially lower intermodulation figure and an improved image ratio. Its sensitivity of $1.8\mu\text{V}$ (IHF) is exceptional, permitting steady hi-fi stereo reception even in fringe signal areas.



17 PRECISION-BUILT FM IF AMPLIFIER:

The heart of any FM tuner is the FM IF amplifier, and in the QRX-6500 this component is outstanding. It combines three bi-resonator ceramic filters and an IC 3-stage limiter that operates with an antenna input as feeble as $1.5\mu\text{V}$. Its selectivity figure of better than 70dB and capture ratio of 1.5dB are characteristic of the quality of the IF amplifier, and of the FM reception you can expect. Other advantages of this expensive FM IF amplifier are particularly evident during FM stereo reception, when the tuner exhibits unexcelled separation and distortion characteristics in the treble range of reproduced sound. Also significant are the greatly improved phase characteristics of the tuner, which contribute much to the faithful reproduction of encoded 4-channel FM stereo broadcast signals in their original 4-channel form.

18 ADVANCED MULTIPLEX CIRCUIT:

The multiplex circuit of the FM tuner combines a 2-stage SCA filter, sharp-cutting LC type carrier leak filter and adjustment-free molded coil block for unusual dependability. These features work to eliminate possible beat interference and intermodulation distortion.

19 FM LINEAR SCALE, WIDE DIAL:

Because a frequency-linear 4-gang variable capacitor is employed in the QRX-6500, the tuner can be equipped with a lateral wide dial featuring an FM scale evenly graduated from 88 to 108MHz in steps of 250kHz. The dial is distinctive in blackout design, and it turns black when functions other than radio reception are selected. The dial pointer is the easy-to-read self-lighting type.

20 EASY, EXACT TUNING:

Two large tuning meters facilitate simple, precise tuning. One is a signal strength

meter that shows the strength of the broadcast signal received, and the other a center-tuning meter to help tune the unit on the center of the discriminator where distortion is minimal.

21 FM MUTING CIRCUIT:

The unpleasant noise heard between stations when tuning on the FM band has been eliminated for good because the QRX-6500 has incorporated a noise-lock type FM muting circuit.

22 300-OHM, 75-OHM ANTENNA TERMINALS:

The QRX-6500 offers 300-ohm balanced input terminals for connecting regular feeder FM antenna, plus 75-ohm unbalanced input terminals for connecting a powerful coaxial FM antenna in fringe signal areas or where strong noise tends to mar pleasant FM reception.

23 OTHER FEATURES:

The QRX-6500 has such convenient refinements as an FM stereo indicator, automatic FM mono/stereo switching, a smooth tuning dial mechanism equipped with a large flywheel, and a $75\mu\text{sec.}/50\mu\text{sec.}$ FM de-emphasis switch for optimum FM reception anywhere in the world.

24 OUTSTANDING AM TUNER:

The QRX-6500's excellent AM tuner section incorporates both an RF amplifier and an IF amplifier with an AGC (Automatic Gain Control) circuit to govern both. It will pull in numerous AM stations with unequalled sensitivity and distortion characteristics. The sensitive, highly selective IF amplifier is equipped with a bi-resonator ceramic filter.

25 "SLIDE-OUT" FERRITE BAR ANTENNA:

The QRX-6500 also has a built-in giant ferrite bar antenna of the "slide-out" type to pull in AM broadcast signals with excellent sensitivity.

SPECIAL FEATURES

26 DISTINGUISHED DESIGN:

The QRX-6500 is a beautiful piece of stereo equipment. Its sophisticated front-panel design combines a silver gold control panel and a blackout dial window. It is encased in a walnut-finished solid wooden cabinet.

27 THREE AC OUTLETS, FOOLPROOF TERMINALS:

Three AC outlets on the rear panel facilitate supplying power to other components in your 4-channel stereo system. One outlet is controlled by the front-panel switch. Color-coded one-touch foolproof pushbutton terminals are provided for connecting speaker systems and antennas.

Understanding QS Four-Channel

TOTAL SOUND FIELD INFORMATION

Two-channel stereo has a disadvantage. It reproduces only two sound source points and a number of phantom images along the line between the two speakers. The QS regular matrix 4-channel system incorporated in Sansui's QRX-6500 is different, since it reproduces the *total acoustic information* present in any live situation—including all the direct sounds as well as the indirect sounds, and even the delicate reverberation. With this capability the QS system approximates with startling reality the original sound field—and, for the first time, right in your own music listening room. The extra pair of rear speakers are the "resources" required for reproducing this additional acoustic information.

THE QS REGULAR MATRIX SYSTEM

This is the Sansui innovation that makes the QRX-6500 such an exclusive. Widely acclaimed since its introduction as the Sansui QS system at the Consumer Electronics Show in New York in 1970, the system has been refined and perfected through the years. It also has acquired a new name—Regular Matrix—in conformity with the standardization and renaming of the system by the audio and recording industries of Japan. The QS regular matrix system consists of a Square 4-channel Matrix and ± 90 -degree phase shifters. Their function is then greatly enhanced by another exclusive, the QS Vario-Matrix circuitry that controls the electronic parameter of the matrix from moment to moment. Additionally, the 2-4 Synthesizer Encoder, another Sansui exclusive, reorganizes and prepares conventional 2-channel signals for optimum conversion into 4-channel.

two signals back into four. A matrix 4-channel system thus offers the advantage of storing total sound field information in conventional 2-channel sources—records, FM and tapes—which can be enjoyed as stereo sound by the millions of stereo owners around the world, or as exciting 4-channel sound if these same persons own a decoder like the QRX-6500 and a second pair of speakers. Of greater significance, the matrix employed in the QS regular matrix system is a square matrix that is rotationally symmetrical and circumferentially uniform. This gives it a number of very important technical advantages: 1) It does not lose or mislocate any part of the original sound field information through the encode-decode process; 2) it provides for excellent inter-channel separation; 3) It gives an outstanding "surround" 4-channel effect since it treats equally all signals originated anywhere in 360 degrees; 4) It does not deteriorate the current standards of hi-fi sound reproduction at all.

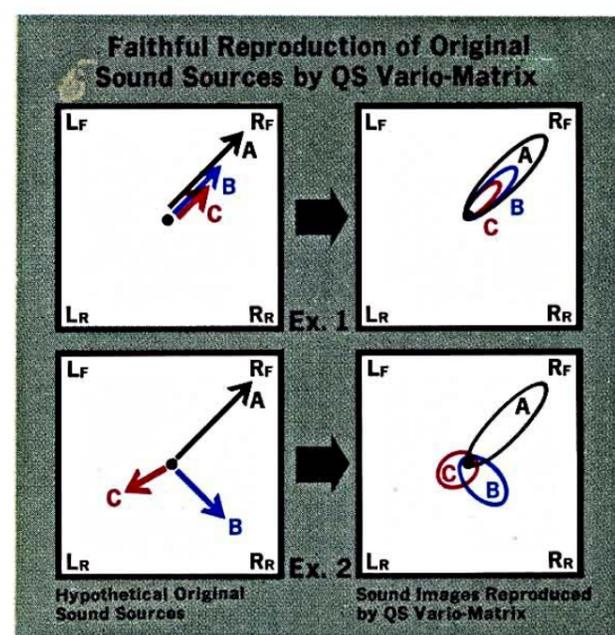
PLUS/MINUS 90-DEGREE PHASE SHIFTERS

While the most technically advantageous, the square matrix has one drawback that is inherent in any matrix system—and that is it puts the two rear signals out of phase with each other. This is easily corrected by what is called a phase shifter circuit, placed after the matrix, that phase-shifts the right rear signal by plus 90 degrees from the front signal and the left rear signal by minus 90 degrees. This puts the two rear signals back in phase and helps to locate all sound sources distinctively in their proper positions.

VARIO-MATRIX CIRCUIT

Sansui's latest 4-channel innovation adds a distinguished finishing touch to the QS regular matrix system. It is made possible by the various psycho-acoustic phenomena of the human hearing mechanism, especially the "directional masking." Non-technically speaking, our ears are such that when sounds of different loudness arrive simultaneously from different directions, the quietest sound is "masked" by the loudest sound, and, naturally, the ears become insensitive to the direction from which it came. We know that this happens whenever there is a difference of 10dB or so in loudness among those sounds. The QS Vario-Matrix simply controls the matrix parameter from moment to moment so as to increase the separation of the loudest sound in proportion to the difference in loudness. This approach, by the way, is entirely different from the complex but technically imperfect "gain control" approach, and ensures that the quantity of the original sound field information is kept completely intact in reproduction. The QS

Vario-Matrix thus provides for almost infinite inter-channel separation in principle, and Sansui has enhanced it by setting the value for optimum separation to the ears from the valid standpoint of music reproduction.



NEW QS SYNTHESIZER

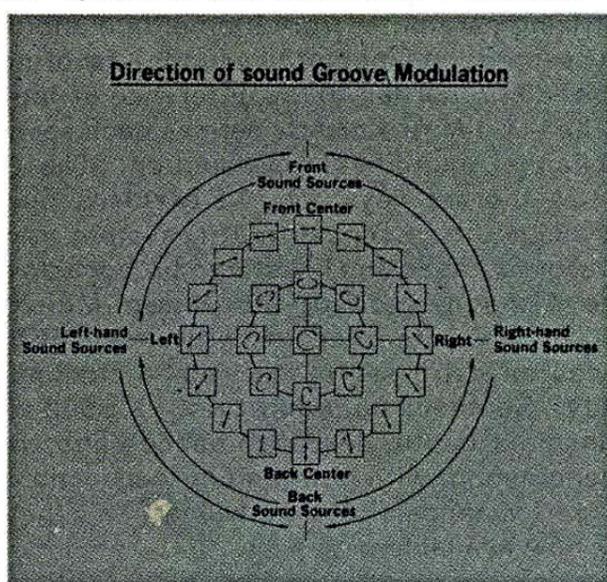
The QS Synthesizer employed by Sansui in the QRX-6500 is highly significant since it lets you enjoy your present collection of stereo records and tapes, as well as FM stereo broadcasts, in the immensely richer and more satisfying 4-channel format. This QS Synthesizer has an exclusive "2-4 Synthesizer Encoder" that works in coordination with the QS regular matrix system. What it does is sort of "pre-process" 2-channel signals from regular stereo program sources, reorganize them and prepare them for optimum conversion into 4-channel.

QS REGULAR MATRIX DECODER

This ingenious piece of circuitry houses the QS regular matrix system and the QS Vario-Matrix circuit. Its task is to handle the reproducing end of the QS regular matrix system—in contrast to its recording end—decoding the 4-channel recordings encoded with the system and restoring the encoded two signals back to the original four signals for 4-channel sound. Of course, there is an ample and interesting selection of 4-channel records and tapes available today, so you can get maximum enjoyment from this decoder.

PHASE MATRIX

Another new feature of the QRX-6500 is the Phase Matrix. This is actually an extra circuit added to the QS Vario-Matrix to fully exploit Sansui's own front-rear logic included in the latter. The result of this circuitry is that you can decode all disc records made by the CBS SQ 4-channel system with stunning front-rear separation.



SQUARE MATRIX

As designated in the terminology of 4-channel stereo, the matrix is an electronic logical network designed to encode four separate signals into two, and decode these

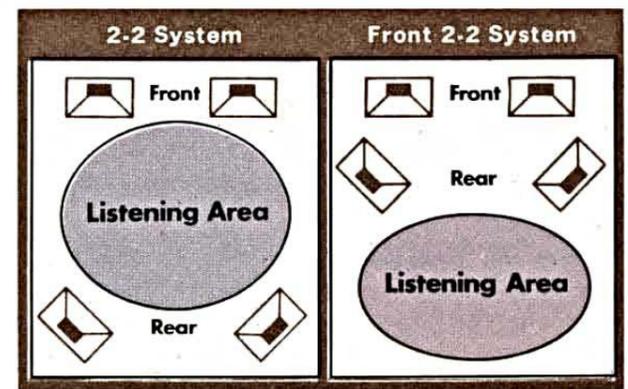
SELECTING AND POSITIONING SPEAKER SYSTEMS

A little knowledge about speaker placement and a little experimentation will go a long way toward providing you with the finest 4-channel sound reproduction possible. Always try to choose four identical speakers. For best results, use speaker systems especially designed for broad sound dispersion.

Basically, there are two common—and recommended placement systems, which we've illustrated below.

2-2 SYSTEM: Regular 4-corner position widely accepted as "standard." Ideal for the rich surround effect.

FRONT 2-2 SYSTEM: Moves the rear speaker systems up front. Best for the concert hall effect, it recreates the stage in front of you and the ambience of the hall around you.



SPECIFICATIONS

AUDIO SECTION

POWER OUTPUT

MUSIC POWER (IHF) 280 Watts into 4Ω
190 Watts into 8Ω

CONTINUOUS OUTPUT POWER
(1kHz, each channel driven)

60 Watts x 4 into 4Ω
37 Watts x 4 into 8Ω

CONTINUOUS OUTPUT POWER
(1kHz, 4-channels driven)

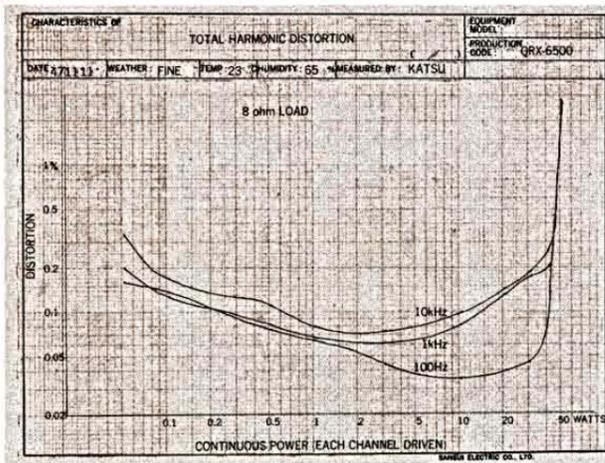
33 Watts x 4 into 8Ω

POWER BANDWIDTH (IHF)

20 to 30,000Hz

TOTAL HARMONIC DISTORTION

less than 0.5% at rated output



INTERMODULATION DISTORTION

less than 0.5% at rated output
(70Hz: 7,000Hz=4:1 SMPTE method)

LOAD IMPEDANCE

4 to 16Ω

DAMPING FACTOR

more than 30 into 8Ω

INPUT SENSITIVITY (1kHz, for rated output)

PHONO 1,2 2.5mV (50kΩ)
AUX (2-CH) 150mV (50kΩ)
AUX (4-CH) LOW LEVEL
150mV (50kΩ)
HIGH LEVEL
450mV (50kΩ)
DISCRETE 4-CH 150mV (50kΩ)
TAPE MON (2-CH) pin, DIN
150mV (50kΩ)
(4-CH) pin, DIN
150mV (50kΩ)

RECORDING OUTPUT

PIN JACKS (2-CH) (4-CH)
150mV
DIN CONNECTOR (2-CH) (4-CH)
30mV



FREQUENCY RESPONSE (AUX 2-CH)

30 to 30,000Hz, ±1.5dB

EQUALIZATION

RIAA curve (30 to 15,000Hz, ±1.5dB)

CHANNEL SEPARATION (at rated output 1,000Hz)

better than 45dB

HUM AND NOISE (IHF)

PHONO better than 60 dB
AUX (2-CH) better than 70 dB
AUX (4-CH) better than 70 dB

TONE CONTROLS (FRONT) (REAR)

BASS +15 dB, -15 dB at 50Hz
TREBLE +15 dB, -15 dB at 20,000Hz

LOUDNESS CONTROLS (FRONT) (REAR)

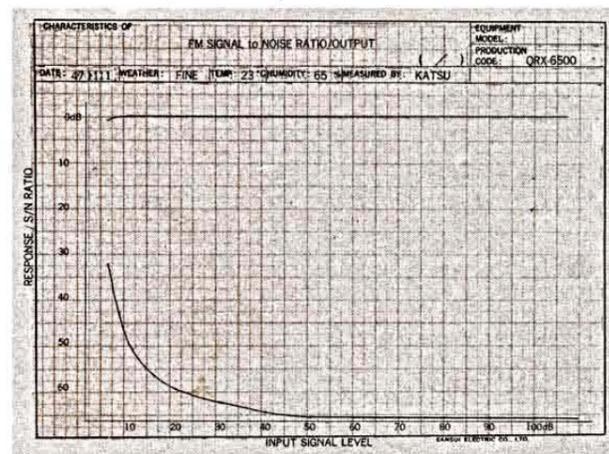
+8 dB at 50Hz, +3 dB
at 10,000Hz

FILTERS (FRONT) (REAR)

LOW -10 dB at 50Hz, 6dB/oct.
HIGH -10 dB at 10,000Hz, 6 dB/oct.

FM SECTION

TUNING RANGE 88-108MHz
SENSITIVITY (IHF) 1.8 μV



TOTAL HARMONIC DISTORTION

less than 0.8% (STEREO)
0.5% (MONO)

SIGNAL TO NOISE RATIO

better than 65 dB

SELECTIVITY

better than 70 dB

CAPTURE RATIO (IHF)

1.5 dB

IMAGE FREQUENCY REJECTION

better than 100 dB

IF REJECTION

better than 100 dB

SPURIOUS RESPONSE REJECTION

better than 100 dB

SPURIOUS RADIATION

less than 34 dB

STEREO SEPARATION

better than 35 dB

ANTENNA INPUT IMPEDANCE

300Ω balanced, 75Ω
unbalanced

AM SECTION

TUNING RANGE 535-1605kHz

SENSITIVITY with FERRITE BAR ANTENNA

50 dB/m

IMAGE FREQUENCY REJECTION

better than 100 dB at
1,000kHz

IF REJECTION

better than 100 dB at
1,000kHz

SELECTIVITY

better than 30 dB

GENERAL

SEMICONDUCTORS

Transistors 110, Diodes 46,
FETs 6, IC 1, Zener Diodes 2

POWER REQUIREMENTS

POWER VOLTAGE 100, 110, 117, 127, 220, 230,
240, 250V 50/60Hz

POWER CONSUMPTION

150 Watts (rated), 470VA (max.)

DIMENSIONS

536mm (21.3") W x 181mm
(7 3/8") H x 363mm (14 5/8") D

WEIGHT

22kg (48.5 lbs.)

Design and specifications subject to change without notice for improvements.

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