

4-Channel Receiver SANSUI QR6500



The Symbol of Sansui 4-Channel Sound



SANSUI QR-6500 4-CHANNEL STEREO RECEIVER This is a monumental audio achievement—perhaps the most important in Sansui's long and illustrious history. A combination of the fabulous new Sansui 4-Channel Synthesizer Decoder, a mighty 280 watt control amplifier and a super-sensitive AM/FM multiplex stereo tuner, the QR-6500 is the receiver for the serious audio enthusiast who's ready for awesomely brilliant multi-dimensional sound field reproduction. This top-of-the-line 4-channel receiver reproduces as no other can, the intensity, the vibrance, and the delicate nuances of live performances. Close your eyes and you're transported from your own living room to Carnegie Hall, the Hollywood Bowl, La Scala—wherever your stereo heart calls home.

The most important element of the QR-6500, of course, is the Sansui

4-Channel Synthesizer Decoder, uniquely able to convert today's 2-channel stereo records, tapes and FM stereo broadcasts into exciting 4-channel sound. And then able to decode 2-channel stereo programs encoded from four channels back to their original 4-channel format. Completely electronic with advanced integrated circuits in its 4-channel synthesizing/decoding matrix, it includes no mechanical time delay or echo device which might impair the quality of reproduced sound. But the greatest assets of the Sansui 4-Channel Synthesizer Decoder are its phase shifter and exclusive phase modulator circuits which process the rear channel sounds to achieve the sound field phenomenon that distinguishes live performances. The QR-6500 4-Channel Stereo Receiver. Sansui's inspired monument to the world's greatest music.

Sansui

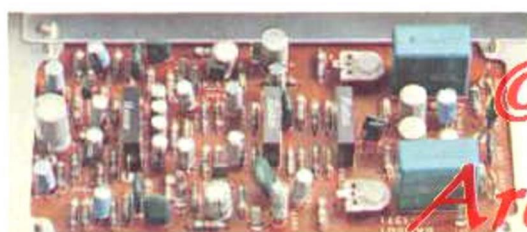
4-CANNEL SYNTHESIZER DECODER SECTION

1 CONVERTS 2-CHANNEL SIGNALS TO FOUR:

This exclusive Sansui device is what enables the QR-6500 to convert your valuable collection of 2-channel stereo records and tapes, as well as FM multiplex stereo broadcasts, to exciting 4-channel stereo sound. In addition, working as a 4-channel decoder, it also separates encoded 2-channel programs—records, tapes or FM stereo broadcasts—back to their original 4-channel form to establish distinct sound images of original sound sources.

FULLY ELECTRONIC:

The 2- to 4-channel conversion described above is achieved completely electronically—without the use of any mechanical time delay or echo device—so that the tonal quality of original sound is not in the least impaired. When an ordinary 2-channel program is being converted, the rear channels will reproduce all the extra, once dormant sound effects—applause of the audience, echo in the concert hall, and in some recordings, even certain musical instruments—sound effects that do so much toward re-creating the original live performances. The resultant 'sound field' effect is quite equal to or, in many cases, even better than that obtainable from discrete 4-channel program sources. The secret is the combined work of the three major components of the 4-Channel Synthesizer Decoder—the 4-channel synthesizing/decoding matrix, phase shifter and phase modulator circuits.



2 UNIQUE PHASE SHIFTER CIRCUIT:

Included in the synthesizer decoder is a unique phase shifter circuit that gives the two rear channels a phase difference of 90 degrees each—plus 90 degrees to the rear left channel and minus 90 degrees to the rear right channel. This puts the rear channels in phase with each other, and establishes a correct phase relationship among all four channels, creating distinct sound images of original sound sources.



3 EXCLUSIVE PHASE MODULATOR CIRCUIT:

The live sound field present in any concert hall or auditorium at the time of an actual performance involves an infinite number of interactions between direct sounds and the innumerable, multi-dimensional indirect sounds with their infinitesimal phase differences. After the matrix reorganizes two-channel signals into four channels and the two rear channels are 'phase-shifted' by plus and minus 90 degrees, these two channels are processed through an exclusive phase modulator circuit (patents pending). Here, the signals are continuously phase-modulated and given the same randomly varying phase differences as are present in the concert

hall at the time of a live performance, and then are finally relayed on for reproduction through the rear left and right speaker systems. When these meet the direct, unaffected sounds emitted by the front left and right speaker systems, an astonishingly vibrant sound field is achieved, very closely approximating the original performance.

4 ADJUSTS FOR ALL TYPES OF MUSIC:

A simple turn of the 4-position Synthesizer Selector lets you exploit each kind of music—whether it be a piano solo a full orchestral performance, rock or jazz—with maximum effectiveness.

CONCERT HALL-1: For music that is best appreciated objectively, such as orchestral performances of symphonies, operas, big-band jazz and combo jazz. Produces a sound field equivalent to the stage of a concert hall in front of the listener. The 'Front 2-2 System' of speaker positioning produces the best results.

CONCERT HALL-2: Best suited for music played by small groups or by individuals, such as chamber music, solo performances, and vocal recitals.

SURROUND/DECODER: Most appropriate for popular vocals, "easy listening" music, country and western, rhythm and blues, and other music which you 'feel', rather than judge. Puts you in the midst of the musical instruments and vocalists to envelope you with sound. Set to this position also when hearing a 4-channel performance encoded into 2-channel form—be it a record, tape or FM multiplex stereo broadcast signal.

2-CH.: For regular 2-channel stereo sound from the front left and right speaker systems only.

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SYNTHESIZER/DECODER



5 VERSATILE MODE SWITCH:

Set to NORMAL, RIGHT QUARTER TURN, HALF TURN or LEFT QUARTER TURN position to bring the front channel sound before you no matter which direction you may be facing. Each adjustment turns the sound around by another 90 degrees.



6 RECORD, PLAYBACK, AUX TERMINALS:

The Synthesizer Decoder section is equipped with record and playback terminals for connecting a 4-channel tape deck, and with 4-channel AUX terminals to permit the reproduction of any discrete 4-channel program sources of now and in the future.



7 CONNECTS FIVE PAIRS OF SPEAKER SYSTEMS:

The QR-6500 can connect no fewer than five pairs of speaker systems—three for the front channels and two for the rear channels. Lets you 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.

8 MASTER BALANCE CONTROL, DIGITAL MODE INDICATOR:

This great receiver also features an over-all balance control between the front channels and the rear channels. It is both easy to operate and check visually. Another convenient feature is a 2- and 4-channel digital mode indicator controlled by the Mode Switch.



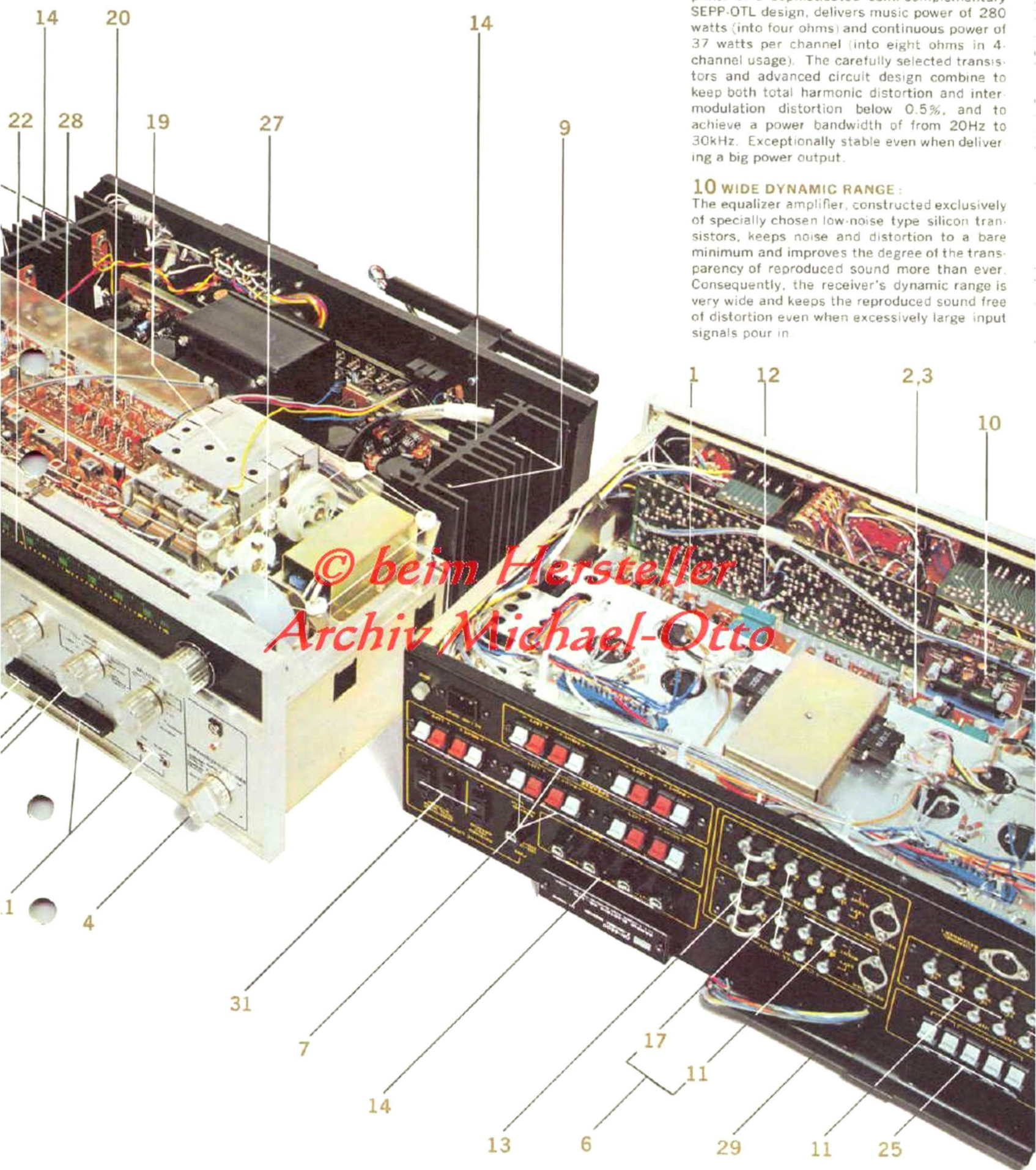
CONTROL AMPLIFIER SECTION

9 MIGHTY 280 WATT POWER AMPLIFIER:

A silicon power transistor-equipped power amplifier of a sophisticated semi-complementary SEPP-OTL design, delivers music power of 280 watts (into four ohms) and continuous power of 37 watts per channel (into eight ohms in 4-channel usage). The carefully selected transistors and advanced circuit design combine to keep both total harmonic distortion and intermodulation distortion below 0.5%, and to achieve a power bandwidth of from 20Hz to 30kHz. Exceptionally stable even when delivering a big power output.

10 WIDE DYNAMIC RANGE:

The equalizer amplifier, constructed exclusively of specially chosen low-noise type silicon transistors, keeps noise and distortion to a bare minimum and improves the degree of the transparency of reproduced sound more than ever. Consequently, the receiver's dynamic range is very wide and keeps the reproduced sound free of distortion even when excessively large input signals pour in.



12- AND 4-CHANNEL TAPE MONITOR CIRCUITS:

The QR-6500 is complete with 2-channel tape monitor circuits (two) and a 4-channel one. If you connect two 2-channel tape decks to the QR-6500, you'll be able to record into both decks simultaneously or reproduce tapes on either deck. In addition, the QR-6500's TAPE REPRINT circuit enables copying tapes from one tape deck to the other and simultaneously monitoring them. One circuit comes with standard pin jack terminals and a DIN connector socket, while the other comes with pin jack terminals and separate front-panel phone type jacks for recording and playback. If you connect a 4-channel tape deck, you will have the capacity to reproduce discrete 4-channel tapes and record the 4-channel signals converted from monophonic programs by the receiver's 4-Channel Synthesizer Decoder.

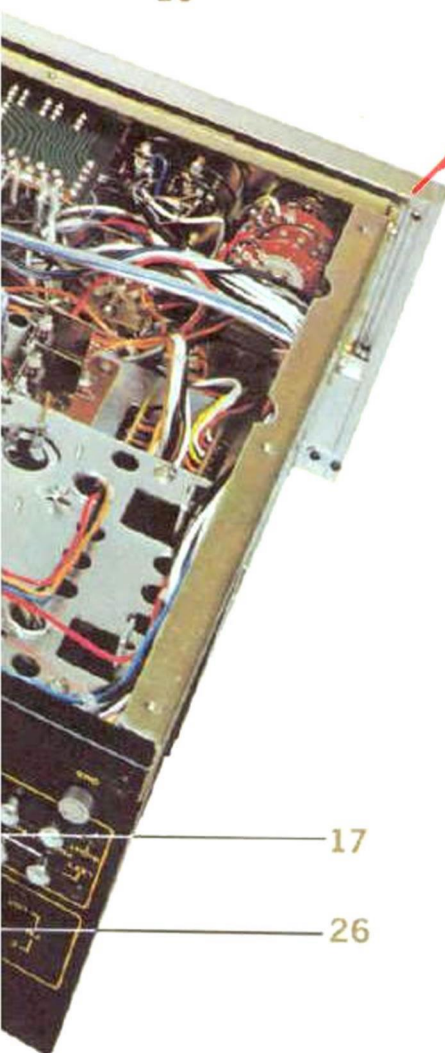
2 BASS, TREBLE TONE CONTROLS, HIGH, LOW FILTERS:

The control amplifier section features separate bass and treble tone controls and separate high and low filters for both the front-channel amplifiers and rear-channel amplifiers.

3 INDEPENDENTLY USABLE PRE- AND POWER AMPLIFIERS:

Both the front and rear channel preamplifiers and power amplifiers can be separated for independent usage to permit full exploitation of their superior basic performance and to further upgrade your 4-channel stereo system adopting the electronic crossover system.

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14 BACK-UP POWER TRANSISTOR PROTECTION:

An exceptionally safe, steady protection circuit, large heat sinks and quick acting fuses combine to ensure perfect protection of the all-important power transistors.

15 STABILIZED POWER SUPPLY CIRCUIT:

Minimized distortion is ensured by the incorporation of a stabilized power supply circuit equipped with a giant power transformer and Zener diodes. This enables each circuit block to operate with exceptional stability and keep distortion to negligible levels.

16 SIMPLE MODE SWITCHING:

The front-panel Mode Switch lets you switch between 2- and 4-channel reproduction. The 2-channel mode, furthermore, offers three alternatives—front channel sound only, rear channel sound only, and both front and rear combined.

17 PHONO, AUX INPUT CIRCUITS:

The control amplifier section is also complete with two phono input circuits and 2- and 4-channel AUX input circuits. The program source selected on the front-panel Function Selector is brightly indicated on the front panel in the black dial window.

18 OTHER ADVANTAGES:

Separate pushbutton loudness controls for the front and rear channels; separate headphone jacks for the front and rear channels, and separate left-right balance controls for the front and rear channels to permit hearing 4-channel stereo with perfect volume balance among the four speaker systems.

19 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 QR-6500 offers a substantially lower intermodulation figure and an improved image ratio. Above all, it offers exceptional $1.8 \mu V$ (IHF) or $1.4 \mu V$ (20dB quieting) sensitivity, permitting steady hi-fi stereo reception even in fringe signal areas.

20 PRECISION-BUILT FM IF AMPLIFIER:

The FM IF amplifier—the heart of any FM tuner—combines a 6-resonator 3-stage amplifying ceramic filter and an IC 3-stage limiter that starts working with an antenna input as feeble as $1.5 \mu V$. It boasts ideal IF amplifier characteristics and assures quality FM reception, as evidenced by a selectivity figure of better than 70dB and capture ratio of 1.5dB. Other advantages of this expensive FM IF amplifier become particularly evident during FM stereo reception, when the tuner exhibits unexcelled separation and distortion characteristics in the treble range of reproduced sound. Also noteworthy are the greatly improved phase characteristics of the tuner, which contribute much to the faithful reproduction of encoded 2-channel FM stereo broadcast signals in their original 4-channel form.

21 ADVANCED MULTIPLEX CIRCUIT:

To preclude possible beat interference and intermodulation distortion, 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 unexcelled dependability in this area.

22 FM LINEAR SCALE, WIDE DIAL:

The use of a frequency-linear 4-gang variable capacitor of unexcelled precision permits equipping the tuner with a lateral wide dial featuring an FM scale evenly graduated from 88 to 108MHz in steps of 250kHz. The dial adopts a distinctive blackout design that turns black when functions other than radio reception are selected. The dial pointer, of course, is an easy-to-see self-lighting type.

23 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 tuner on the center of the discriminator.

24 FM MUTING CIRCUIT:

The unpleasant noise heard between stations when tuning on the FM band has been vanquished for good by the incorporation of a noise-lock type FM muting circuit.

25 300-OHM, 75-OHM ANTENNA TERMINALS:

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

26 DISTANT/LOCAL SWITCH:

The rear panel DISTANT/LOCAL switch permits changing the FM antenna input sensitivity to facilitate steady, noiseless, distortion-free reception in both strong and weak signal areas.

27 OTHER REFINEMENTS:

The QR-6500 also comes with such convenient refinements as an FM stereo indicator, automatic FM mono/stereo switching, and a smooth tuning dial mechanism equipped with a large flywheel.

28 SUPERB AM TUNER:

The receiver's excellent AM tuner section incorporates both an RF amplifier and an IF amplifier, with an AGC (Automatic Gain Control) circuit governing both, to pull in numerous AM stations with unsurpassed sensitivity and distortion characteristics. The sensitive, highly selective IF amplifier is equipped with a two-resonator ceramic filter.

29 'SLIDE-OUT' FERRITE BAR ANTENNA:

The QR-6500 also has a built-in giant ferrite bar antenna of the 'slide-out' type, which pulls in AM broadcast signals with unexcelled sensitivity.

SPECIAL FEATURES

30 DISTINGUISHED DESIGN:

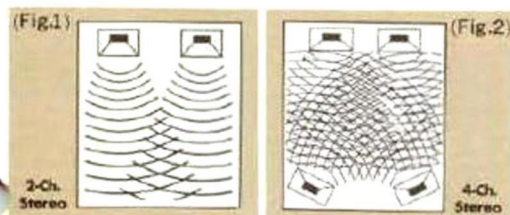
The QR-6500's sophisticated front-panel design combines a silver gold control panel and a blackout dial window. Encased in a walnut-finished solid wooden cabinet, the receiver is unsurpassed for beauty and functional styling.

31 THREE AC OUTLETS, FOOLPROOF TERMINALS:

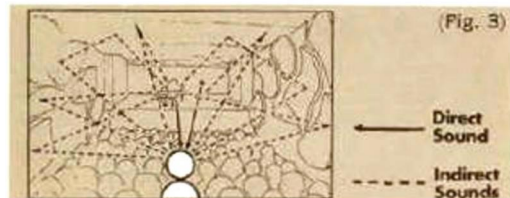
Three AC outlets on the rear panel facilitate supplying power to other components in your 4-channel stereo system. One outlet is controlled by the front-panel power switch. The receiver is also complete with color-coded one-touch foolproof pushbutton terminals for connecting speaker systems and antennas.

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THE SANSUI QR-6500 4-CHANNEL RECEIVER 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 source points (Fig. 1). By moving up to 4-channel stereo with the Sansui QR-6500 4-Channel Receiver 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 source point method of reproduction to the reproduction of an entire sound field. This is made possible by the Sansui QR-6500's capability to handle reflected or indirect sound, in addition to direct sound, as an independent sound source.



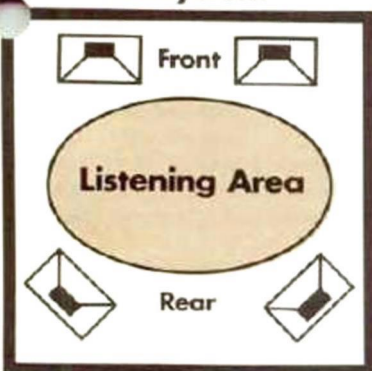
SOUND FIELD: By sound field we mean all of the sounds that you are exposed to in a live performance—not only those coming directly from a stage—but those far more numerous indirect sounds which are reflected by the ceiling, walls, floor and furnishings as well (Fig. 3). The extra pair of speaker systems 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 QR-6500 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 QR-6500 offers the immediate advantage of converting existing 2-channel program



POSITIONING SPEAKER SYSTEMS

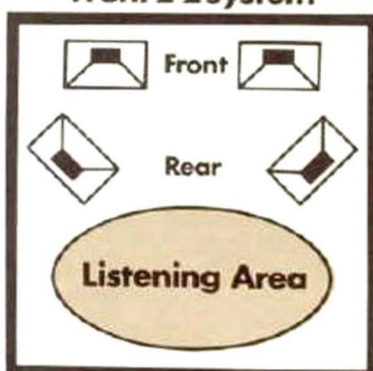
This is a very important aspect of the entire new format. Speaker positioning can do much to determine just how you can exploit your new system to maximum advantage. Here are four different possibilities:

2-2 system



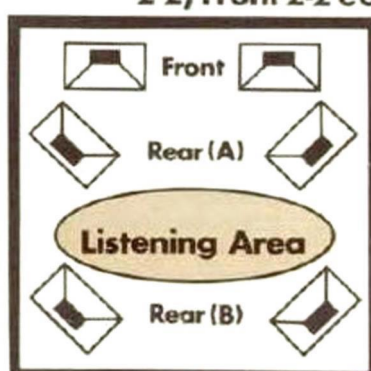
2-2 System: Regular 4-corner position widely accepted as "standard". Most effective for listening to mood music, rhythm and blues, vocal numbers and "recorded-live" records.

Front 2-2 system

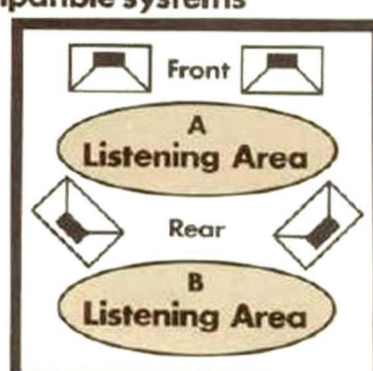


Front 2-2 system: Best for symphonies, operas, chamber music and big band jazz.

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 rear Speakers Switch.

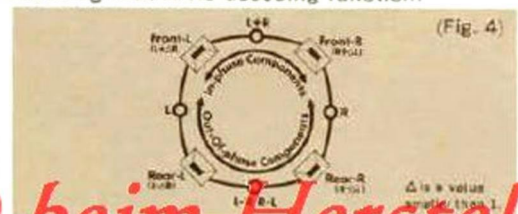


2-2 / Front 2-2 Compatible Positioning Method: With the rear speakers placed as shown here, you're able to enjoy both the regular 2-2 system and the Front 2-2 system by moving from point A to point B.

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.

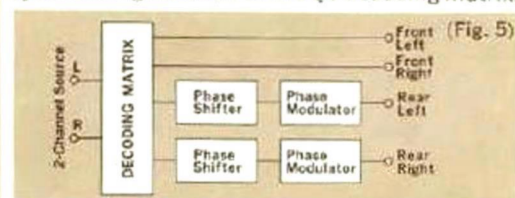
sources to the new 4-channel format. This is done by letting the second pair of speaker systems take over much of the sound burden formerly borne by one pair alone. The two pairs are then repositioned so that indirect sounds and extreme end sounds are processed through the QR-6500's QS decoding matrix before being emitted through the rear speaker systems, for a remarkable increase in liveliness and presence.

HOW THE QR-6500 WORKS: The QR-6500 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 restoration capability of the QS decoding matrix its decoding function.

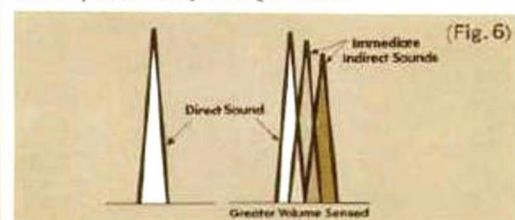


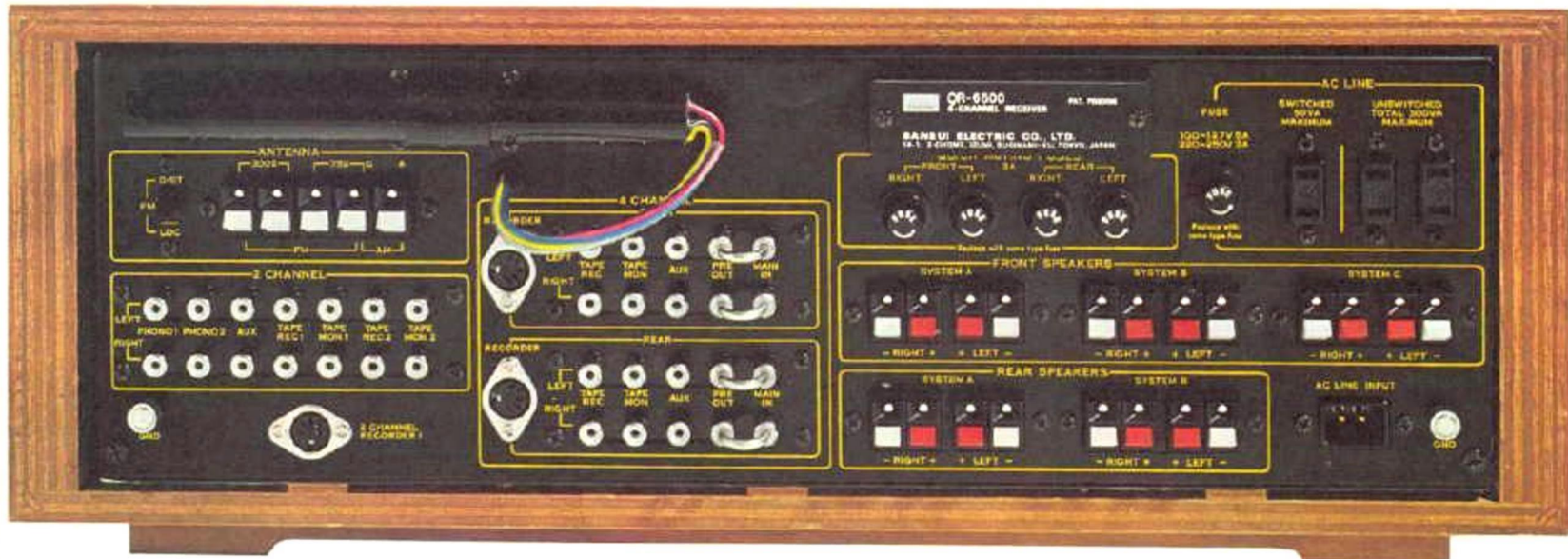
QS DECODING MATRIX: This is the first step on the way to converting 2-channel sound sources into the immensely richer sound of 4-channel stereo. To understand it, let's imagine an orchestra on stage. The two recording microphones in 2-channel stereo are normally spaced on either side of the center of 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 microphone) and direct independent (those produced at the extreme ends of the stage) are randomly mixed and delivered as

lump left and right channel signals. The QS decoding matrix in the QR-6500 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 direct 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 QR-6500 takes the rear channel sound components—shown 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. 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 randomly varying 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 QR-6500.





SPECIFICATIONS

POWER AMPLIFIER SECTION

POWER OUTPUT

Music Power (IHF)	280W	at 4Ω load
	190W	at 8Ω load
Continuous Power	50Wx4	at 4Ω load
	37Wx4	at 8Ω load

TOTAL HARMONIC DISTORTION

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

POWER BANDWIDTH (IHF)

FREQUENCY RESPONSE	20 to 30,000Hz (at normal listening level)
	20 to 30,000Hz ± 1 dB

CHANNEL SEPARATION

HUM AND NOISE (IHF)	better than 55dB
	better than 70dB

INPUT IMPEDANCE

LOAD IMPEDANCE	1V for rated output
DAMPING FACTOR	100KΩ

PREAMPLIFIER SECTION

OUTPUT VOLTAGE

Maximum Output Voltage	3.5V
Rated Output Voltage	1V

TOTAL HARMONIC DISTORTION

FREQUENCY RESPONSE	less than 0.1% at rated output Voltage
	30 to 30,000Hz ± 1 dB

CHANNEL SEPARATION

HUM AND NOISE (IHF)	better than 50dB
	(AUX: 10kΩ, at 1,000Hz)

HUM AND NOISE (IHF)

PHONO 1 and 2	better than 60dB
AUX	better than 70dB

INPUT SENSITIVITY

	(at 1,000Hz, rated output voltage)
PHONO 1 and 2	2mV (50kΩ)
AUX (2CH)	150mV (50kΩ)
AUX (4CH)	410mV (50kΩ)

TAPE MON (pin) (2CH)

	150mV (50kΩ)
TAPE MON (pin) (4CH)	410mV (50kΩ)
TAPE RECORDER (DIN) (2CH)	150mV (50kΩ)
TAPE RECORDER (DIN) (4CH)	410mV (50kΩ)

RECORDING OUTPUT

TAPE REC (pin) (2CH)	150mV
TAPE REC (pin) (4CH)	410mV
TAPE RECORDER	

(DIN) (2CH)	30mV
TAPE RECORDER	
(DIN) (4CH)	90mV

EQUALIZER

PHONO	RIAA NF type
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CONTROLS (Front and Rear)

BASS	+15dB -15dB at 50Hz
TREBLE	+15dB -15dB at 20,000Hz
LOUDNESS	(volume control at -30dB) +5dB at 50Hz, +3dB at 10,000Hz -10dB 50Hz -10dB at 10,000Hz
LOW FILTER	
HIGH FILTER	

SYNTHESIZER SECTION

FREQUENCY RESPONSE

Front Channel	20 to 20,000Hz ± 1 dB
Rear Channel	20 to 20,000Hz ± 1 dB

REAR CHANNEL PHASE SHIFT

Left	90 degree at 250Hz
Right	90 degree at 450Hz

REAR CHANNEL PHASE MODULATION

Mod. 180 degrees at 10,000Hz (by Sansui's phase modulation system)
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TUNER SECTION

FM:

TUNING RANGE	88 to 108 MHz
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SENSITIVITY

(20dB quieting)	1.4μV
(IHF)	1.8μV

TOTAL HARMONIC DISTORTION

	less than 0.8%
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SIGNAL TO NOISE RATIO

	better than 65dB
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SELECTIVITY

	better than 70dB
--	------------------

CAPTURE RATIO (IHF)

	1.5dB
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IMAGE FREQUENCY REJECTION

	better than 90dB
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IF REJECTION

	better than 90dB
--	------------------

SPURIOUS RESPONSE REJECTION

	better than 90dB
--	------------------

STEREO SEPARATION

	better than 35dB
--	------------------

SPURIOUS RADIATION

	less than 34dB
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ANTENNA INPUT IMPEDANCE

	300Ω balanced, 75Ω unbalanced
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AM:

TUNING RANGE	535 to 1,605 kHz
SENSITIVITY (IHF)	50μV

IMAGE FREQUENCY REJECTION

	250μV Ferrite bar Antenna
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IF REJECTION

	better than 50dB at 1,000kHz
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SELECTIVITY

	better than 80dB at 1,000kHz
--	------------------------------

SWITCHES

SECTOR	PHONO-2, PHONO-1, FM
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MODE

	AUTO, FM MONO, AM, AUX
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2-CHANNEL

	REAR, FRONT, FRONT and REAR
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4-CHANNEL

	NORMAL, RIGHT QUARTER TURN, HALF TURN, LEFT QUARTER TURN
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SYNTHESIZER/DECODER

	2 CHANNEL, CONCERT HALL-1, CONCERT HALL-2, SURROUND/DECODER
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TAPE MONITOR-1 AND 2 (2CH)

	SOURCE, PLAY BACK
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TAPE MONITOR (4CH)

	SOURCE, PLAY BACK
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FM ANTENNA SENSITIVITY SELECTOR

	ON, OFF
--	---------

GENERAL

	OFF, ON
--	---------

HIGH FILTER

	OFF, ON
--	---------

LOW FILTER

	OFF, ON
--	---------

SPEAKER SELECTOR

	OFF, SYSTEM-A, SYSTEM-B, SYSTEM-C, SYSTEM-A+B, SYSTEM-A+C
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SPEAKER SELECTOR

	OFF, SYSTEM-A, SYSTEM-B, SYSTEM-A+B
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FM ANTENNA SENSITIVITY SELECTOR

	DISTANT, LOCAL
--	----------------

OTHER SPECIAL FEATURE

	MW Ferrite Bar Antenna
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SEMICONDUCTORS

	Transistors: 93 FETs:4 Diodes:24
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POWER REQUIREMENTS

	Zener Diodes:2 ICs:5 Modules:5
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POWER VOLTAGE

	100V, 110V, 117V, 127V, 220V, 230V, 240V, 250V
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POWER CONSUMPTION

	470W (max. signal)
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DIMENSIONS

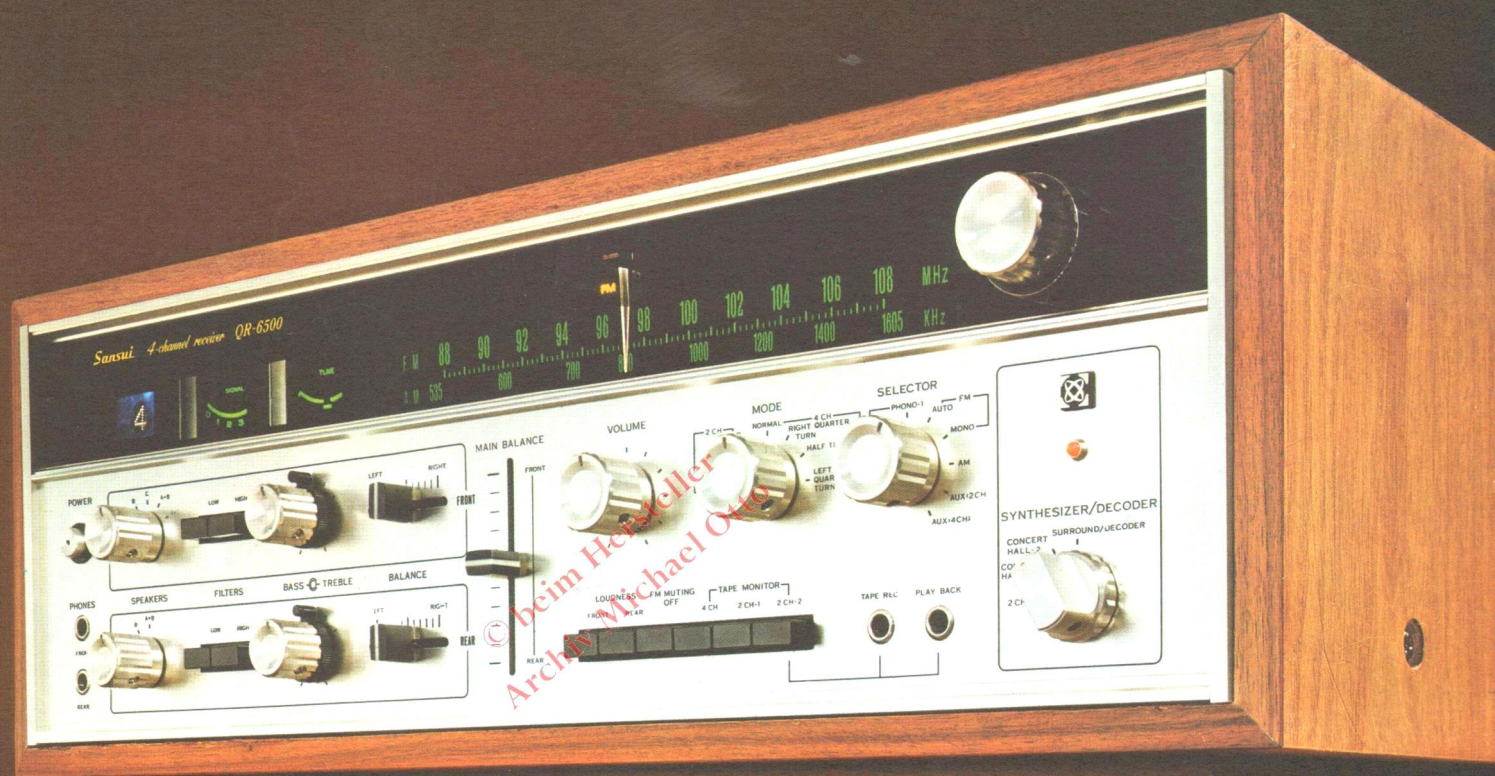
	538mm (21 1/8")Wx197mm (7 7/8")Hx362mm (14 1/8")D
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WEIGHT

	22 kg (48.5 lbs.)
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4-Channel Receiver SANSUI

QR6500



The Symbol of Sansui 4 Channel Sound

SANSUI QR-6500 4-CHANNEL STEREO RECEIVER This is a monumental audio achievement—perhaps the most important in Sansui's long and illustrious history. A combination of the fabulous new Sansui 4-Channel Synthesizer Decoder, a mighty 280 watt control amplifier and a super-sensitive AM/FM multiplex stereo tuner, the QR-6500 is the receiver for the serious audio enthusiast who's ready for awesomely brilliant multi-dimensional sound field reproduction. This top-of-the-line 4-channel receiver reproduces as no other can, the intensity, the vibrance, and the delicate nuances of live performances. Close your eyes and you're transported from your own living room to Carnegie Hall, the Hollywood Bowl, La Scala—wherever your stereo heart calls home. The most important element of the QR-6500, of course, is the Sansui

4-Channel Synthesizer Decoder, uniquely able to convert today's 2-channel stereo records, tapes and FM stereo broadcasts into exciting 4-channel sound. And then able to decode 2-channel stereo programs encoded from four channels back to their original 4-channel format. Completely electronic with advanced integrated circuits in its 4-channel synthesizing/decoding matrix, it includes no mechanical time delay or echo device which might impair the quality of reproduced sound. But the greatest assets of the Sansui 4-Channel Synthesizer Decoder are its phase shifter and exclusive phase modulator circuits which process the rear channel sounds to achieve the sound field phenomenon that distinguishes live performances. The QR-6500 4-Channel Stereo Receiver. Sansui's inspired monument to the world's greatest music.

Sansui

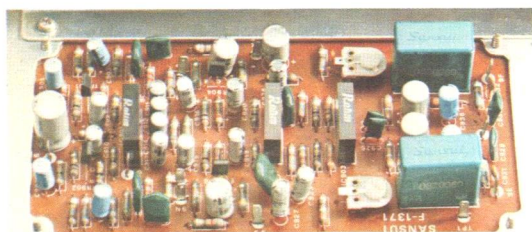
4-CHANNEL SYNTHESIZER DECODER SECTION

1 CONVERTS 2-CHANNEL SIGNALS TO FOUR:

This exclusive Sansui device is what enables the QR-6500 to convert your valuable collection of 2-channel stereo records and tapes, as well as FM multiplex stereo broadcasts, to exciting 4-channel stereo sound. In addition, working as a 4-channel decoder, it also separates encoded 2-channel programs—records, tapes or FM stereo broadcasts—back to their original 4-channel form to establish distinct sound images of original sound sources.

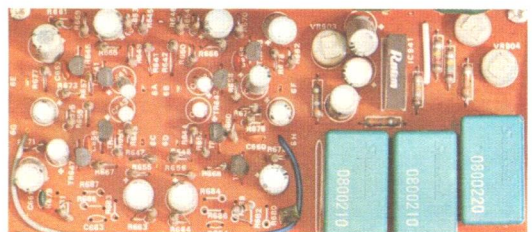
FULLY ELECTRONIC:

The 2- to 4-channel conversion described above is achieved completely electronically—without the use of any mechanical time delay or echo device—so that the tonal quality of original sound is not in the least impaired. When an ordinary 2-channel program is being converted, the rear channels will reproduce all the extra, once dormant sound effects—applause of the audience, echo in the concert hall, and in some recordings, even certain musical instruments—sound effects that do so much toward re-creating the original live performances. The resultant 'sound field' effect is quite equal to or, in many cases, even better than that obtainable from discrete 4-channel program sources. The secret is the combined work of the three major components of the 4-Channel Synthesizer Decoder—the 4-channel synthesizing/decoding matrix, phase shifter and phase modulator circuits.



2 UNIQUE PHASE SHIFTER CIRCUIT:

Included in the synthesizer decoder is a unique phase shifter circuit that gives the two rear channels a phase difference of 90 degrees each—plus 90 degrees to the rear left channel and minus 90 degrees to the rear right channel. This puts the rear channels in phase with each other, and establishes a correct phase relationship among all four channels, creating distinct sound images of original sound sources.



3 EXCLUSIVE PHASE MODULATOR CIRCUIT:

The live sound field present in any concert hall or auditorium at the time of an actual performance involves an infinite number of interactions between direct sounds and the innumerable, multi-dimensional indirect sounds with their infinitesimal phase differences. After the matrix reorganizes two-channel signals into four channels and the two rear channels are 'phase-shifted' by plus and minus 90 degrees, these two channels are processed through an exclusive phase modulator circuit (patents pending). Here, the signals are continuously phase-modulated and given the same randomly varying phase differences as are present in the concert

hall at the time of a live performance, and then are finally relayed on for reproduction through the rear left and right speaker systems. When these meet the direct, unaffected sounds emitted by the front left and right speaker systems, an astonishingly vibrant sound field is achieved, very closely approximating the original performance.

4 ADJUSTS FOR ALL TYPES OF MUSIC:

A simple turn of the 4-position Synthesizer Selector lets you exploit each kind of music—whether it be a piano solo a full orchestral performance, rock or jazz—with maximum effectiveness.

CONCERT HALL-1: For music that is best appreciated objectively, such as orchestral performances of symphonies, operas, big-band jazz and combo jazz. Produces a sound field equivalent to the stage of a concert hall in front of the listener. The 'Front 2-2 System' of speaker positioning produces the best results.

CONCERT HALL-2: Best suited for music played by small groups or by individuals, such as chamber music, solo performances, and vocal recitals.

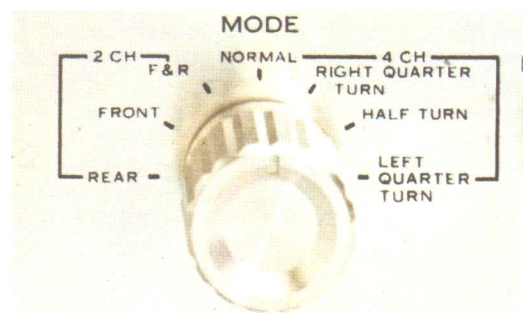
SURROUND/DECODER: Most appropriate for popular vocals, "easy listening" music, country and western, rhythm and blues, and other music which you 'feel', rather than judge. Puts you in the midst of the musical instruments and vocalists to envelope you with sound. Set to this position also when hearing a 4-channel performance encoded into 2-channel form—be it a record, tape or FM multiplex stereo broadcast signal.

2-CH.: For regular 2-channel stereo sound from the front left and right speaker systems only.



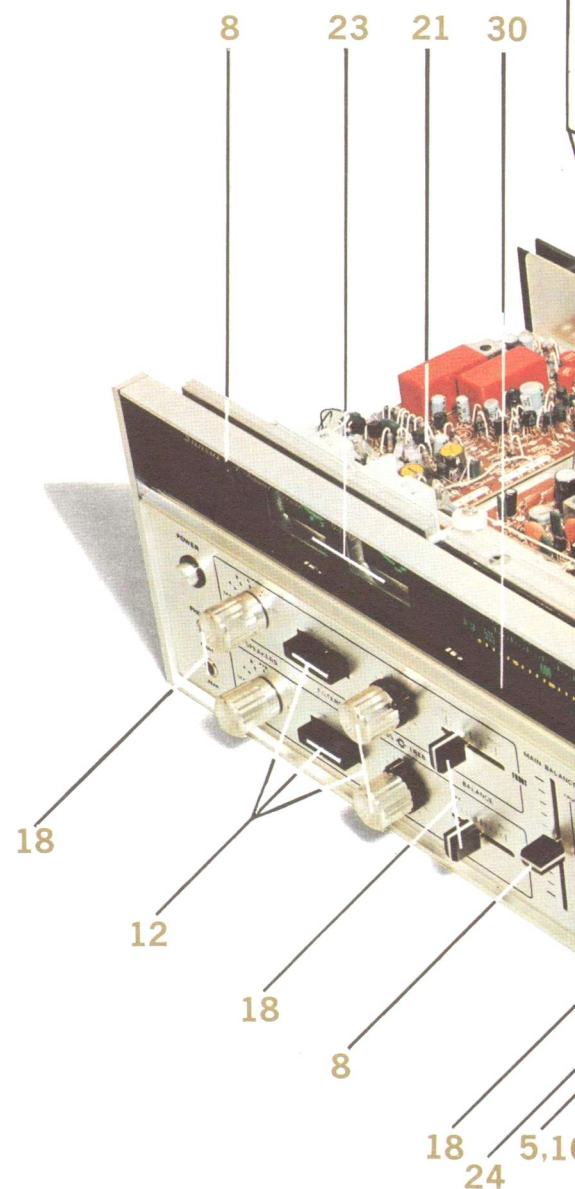
5 VERSATILE MODE SWITCH:

Set to NORMAL, RIGHT QUARTER TURN, HALF TURN or LEFT QUARTER TURN position to bring the front channel sound before you no matter which direction you may be facing. Each adjustment turns the sound around by another 90 degrees.



6 RECORD/PLAYBACK, AUX TERMINALS:

The Synthesizer Decoder section is equipped with record and playback terminals for connecting a 4-channel tape deck, and with 4-channel AUX terminals to permit the reproduction of any discrete 4-channel program sources of now and in the future.



7 CONNECTS FIVE PAIRS OF SPEAKER SYSTEMS:

The QR-6500 can connect no fewer than five pairs of speaker systems—three for the front channels and two for the rear channels. Lets you 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.

8 MASTER BALANCE CONTROL, DIGITAL MODE INDICATOR:

This great receiver also features an over-all balance control between the front channels and the rear channels. It is both easy to operate and check visually. Another convenient feature is a 2- and 4-channel digital mode indicator controlled by the Mode Switch.



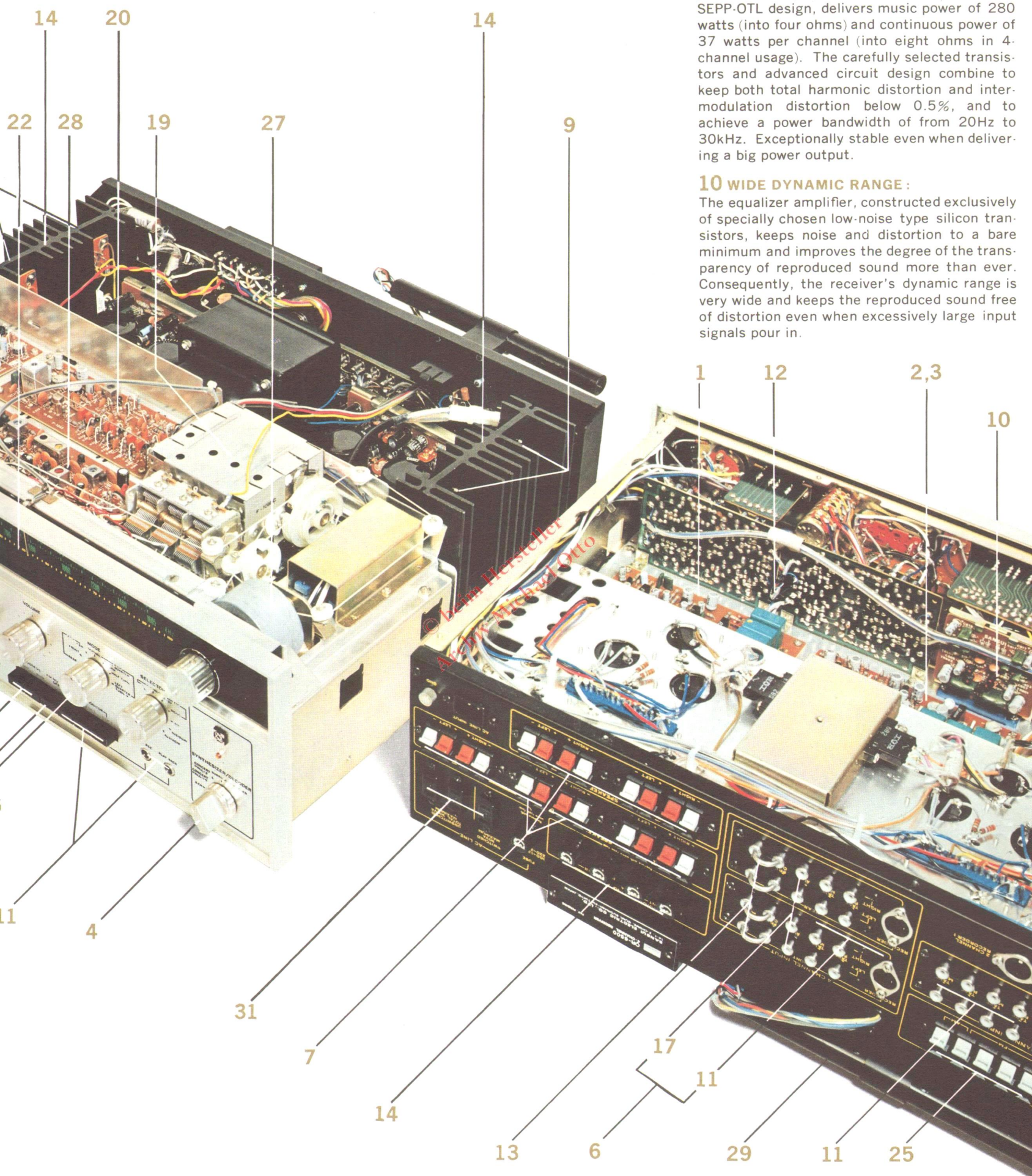
CONTROL AMPLIFIER SECTION

9 MIGHTY 280 WATT POWER AMPLIFIER:

A silicon power transistor-equipped power amplifier of a sophisticated semi-complementary SEPP-OTL design, delivers music power of 280 watts (into four ohms) and continuous power of 37 watts per channel (into eight ohms in 4-channel usage). The carefully selected transistors and advanced circuit design combine to keep both total harmonic distortion and intermodulation distortion below 0.5%, and to achieve a power bandwidth of from 20Hz to 30kHz. Exceptionally stable even when delivering a big power output.

10 WIDE DYNAMIC RANGE:

The equalizer amplifier, constructed exclusively of specially chosen low-noise type silicon transistors, keeps noise and distortion to a bare minimum and improves the degree of the transparency of reproduced sound more than ever. Consequently, the receiver's dynamic range is very wide and keeps the reproduced sound free of distortion even when excessively large input signals pour in.



11 2- AND 4-CHANNEL TAPE MONITOR CIRCUITS:

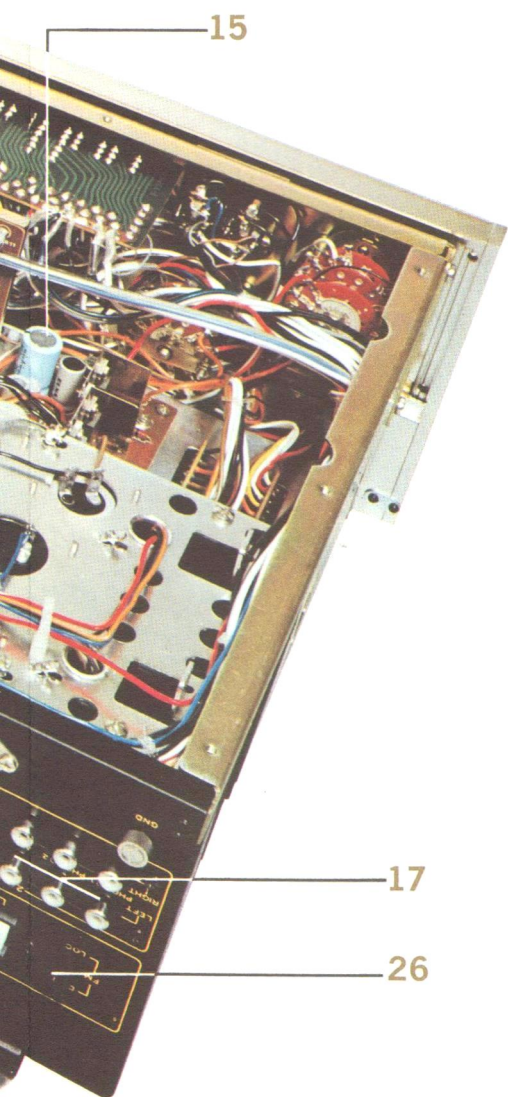
The QR-6500 is complete with 2-channel tape monitor circuits (two) and a 4-channel one. If you connect two 2-channel tape decks to the QR-6500, you'll be able to record into both decks simultaneously or reproduce tapes on either deck. In addition, the QR-6500's TAPE TO TAPE REPRINT circuit enables copying tapes from one tape deck to the other and simultaneously monitoring them. One circuit comes with standard pin jack terminals and a DIN connector socket, while the other comes with pin jack terminals and separate front-panel phone type jacks for recording and playback. If you connect a 4-channel tape deck, you will have the capability to reproduce discrete 4-channel tapes and record the 4-channel signals converted from 2-channel programs by the receiver's 4-Channel Synthesizer Decoder.

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

The control amplifier section features separate bass and treble tone controls and separate high and low filters for both the front-channel amplifiers and rear-channel amplifiers.

13 INDEPENDENTLY USABLE PRE- AND POWER AMPLIFIERS:

Both the front and rear channel preamplifiers and power amplifiers can be separated for independent usage to permit full exploitation of their superior basic performance and to further upgrade your 4-channel stereo system by adopting the electronic crossover system.



14 BACK-UP POWER TRANSISTOR PROTECTION:

An exceptionally safe, steady protection circuit, large heat sinks and quick acting fuses combine to ensure perfect protection of the all-important power transistors.

15 STABILIZED POWER SUPPLY CIRCUIT:

Minimized distortion is ensured by the incorporation of a stabilized power supply circuit equipped with a giant power transformer and Zener diodes. This enables each circuit block to operate with exceptional stability and keep distortion to negligible levels.

16 SIMPLE MODE SWITCHING:

The front-panel Mode Switch lets you switch between 2- and 4-channel reproduction. The 2-channel mode, furthermore, offers three alternatives—front channel sound only, rear channel sound only, and both front and rear combined.

17 PHONO, AUX INPUT CIRCUITS:

The control amplifier section is also complete with two phono input circuits and 2- and 4-channel AUX input circuits. The program source selected on the front-panel Function Selector is brightly indicated on the front panel in the black dial window.

18 OTHER ADVANTAGES:

Separate pushbutton loudness controls for the front and rear channels; separate headphone jacks for the front and rear channels, and separate left-right balance controls for the front and rear channels to permit hearing 4-channel stereo with perfect volume balance among the four speaker systems.

TUNER SECTION

19 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 QR-6500 offers a substantially lower intermodulation figure and an improved image ratio. Above all, it offers exceptional $1.8 \mu\text{V}$ (IHF) or $1.4 \mu\text{V}$ (20dB quieting) sensitivity, permitting steady hi-fi stereo reception even in fringe signal areas.

20 PRECISION-BUILT FM IF AMPLIFIER:

The FM IF amplifier—the heart of any FM tuner—combines a 6-resonator 3-stage amplifying ceramic filter and an IC 3-stage limiter that starts working with an antenna input as feeble as $1.5 \mu\text{V}$. It boasts ideal IF amplifier characteristics and assures quality FM reception, as evidenced by a selectivity figure of better than 70dB and capture ratio of 1.5dB. Other advantages of this expensive FM IF amplifier become particularly evident during FM stereo reception, when the tuner exhibits unexcelled separation and distortion characteristics in the treble range of reproduced sound. Also noteworthy are the greatly improved phase characteristics of the tuner, which contribute much to the faithful reproduction of encoded 2-channel FM stereo broadcast signals in their original 4-channel form.

21 ADVANCED MULTIPLEX CIRCUIT:

To preclude possible beat interference and intermodulation distortion, 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 unexcelled dependability in this area.

22 FM LINEAR SCALE, WIDE DIAL:

The use of a frequency-linear 4-gang variable capacitor of unexcelled precision permits equipping the tuner with a lateral wide dial featuring an FM scale evenly graduated from 88 to 108MHz in steps of 250kHz. The dial adopts a distinctive blackout design that turns black when functions other than radio reception are selected. The dial pointer, of course, is an easy-to-see self-lighting type.

23 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 tuner on the center of the discriminator.

24 FM MUTING CIRCUIT:

The unpleasant noise heard between stations when tuning on the FM band has been vanquished for good by the incorporation of a noise-lock type FM muting circuit.

25 300-OHM, 75-OHM ANTENNA TERMINALS:

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

26 DISTANT/LOCAL SWITCH:

The rear panel DISTANT/LOCAL switch permits changing the FM antenna input sensitivity to facilitate steady, noiseless, distortion-free reception in both strong and weak signal areas.

27 OTHER REFINEMENTS:

The QR-6500 also comes with such convenient refinements as an FM stereo indicator, automatic FM mono/stereo switching, and a smooth tuning dial mechanism equipped with a large flywheel.

28 SUPERB AM TUNER:

The receiver's excellent AM tuner section incorporates both an RF amplifier and an IF amplifier, with an AGC (Automatic Gain Control) circuit governing both, to pull in numerous AM stations with unsurpassed sensitivity and distortion characteristics. The sensitive, highly selective IF amplifier is equipped with a two-resonator ceramic filter.

29 'SLIDE-OUT' FERRITE BAR ANTENNA:

The QR-6500 also has a built-in giant ferrite bar antenna of the 'slide-out' type, which pulls in AM broadcast signals with unexcelled sensitivity.

SPECIAL FEATURES

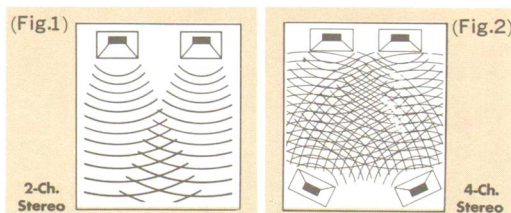
30 DISTINGUISHED DESIGN:

The QR-6500's sophisticated front-panel design combines a silver gold control panel and a blackout dial window. Encased in a walnut-finished solid wooden cabinet, the receiver is unsurpassed for beauty and functional styling.

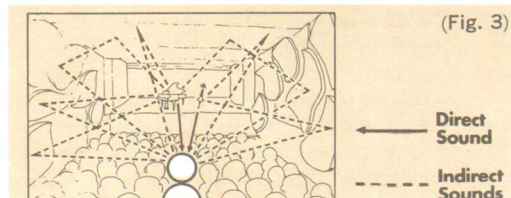
31 THREE AC OUTLETS, FOOLPROOF TERMINALS:

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 power switch. The receiver is also complete with color-coded one-touch foolproof pushbutton terminals for connecting speaker systems and antennas.

THE SANSUI QR-6500 4-CHANNEL RECEIVER 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 source points (Fig. 1). By moving up to 4-channel stereo with the Sansui QR-6500 4-Channel Receiver 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 source point method of reproduction to the reproduction of an entire sound field. This is made possible by the Sansui QR-6500's capability to handle reflected or indirect sound, in addition to direct sound, as an independent sound source.

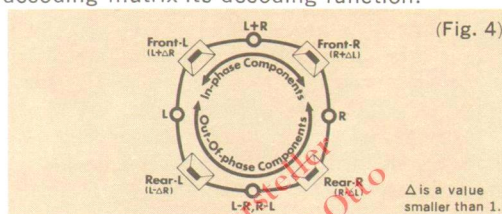


SOUND FIELD: By sound field we mean all of the sounds that you are exposed to in a live performance—not only those coming directly from a stage—but those far more numerous indirect sounds which are reflected by the ceiling, walls, floor and furnishings as well (Fig. 3). The extra pair of speaker systems 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 QR-6500 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 QR-6500 offers the immediate advantage of converting existing 2-channel program



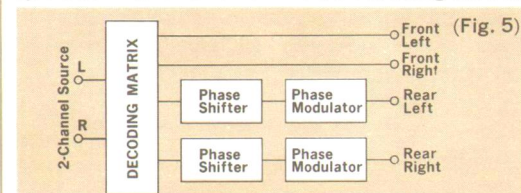
sources to the new 4-channel format. This is done by letting the second pair of speaker systems take over much of the sound burden formerly borne by one pair alone. The two pairs are then repositioned so that indirect sounds and extreme end sounds are processed through the QR-6500's QS decoding matrix before being emitted through the rear speaker systems, for a remarkable increase in liveliness and presence.

HOW THE QR-6500 WORKS: The QR-6500 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 restoration capability of the QS decoding matrix its decoding function.

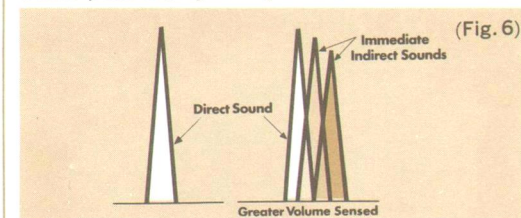


QS DECODING MATRIX: This is the first step on the way to converting 2-channel sound sources into the immensely richer sound of 4-channel stereo. To understand it fully, imagine an orchestra on stage. The two recording microphones in 2-channel stereo are normally spaced on either side of the center of 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 microphone) and direct independent (those produced at the extreme ends of the stage) are randomly mixed and delivered as

lump left and right channel signals. The QS decoding matrix in the QR-6500 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 direct 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.



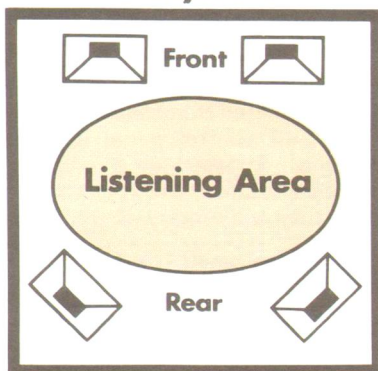
PHASE MODULATION: As the illustration shows, the QR-6500 takes the rear channel sound components—shown as a regular pulse form—and through its unique process of phase modulation, gives it increased depth and richness without requiring an increase in power. The principle is easy enough to understand: 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. 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 randomly varying 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 QR-6500.



POSITIONING SPEAKER SYSTEMS

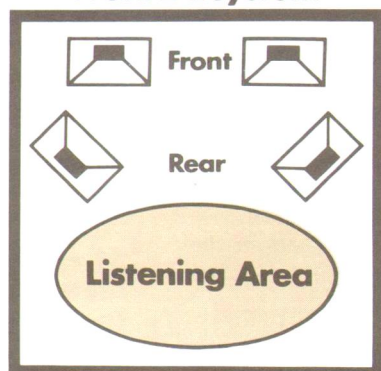
This is a very important aspect of the entire new format. Speaker positioning can do much to determine just how you can exploit your new system to maximum advantage. Here are four different possibilities:

2-2 system



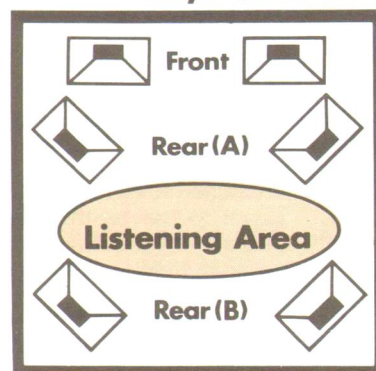
2-2 System: Regular 4-corner position widely accepted as "standard". Most effective for listening to mood music, rhythm and blues, vocal numbers and "recorded-live" records.

Front 2-2 system

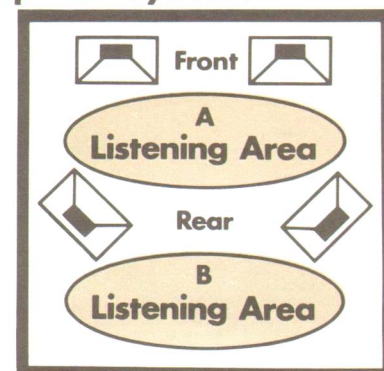


Front 2-2 system: Best for symphonies, operas, chamber music and big band jazz.

2-2/Front 2-2 compatible systems

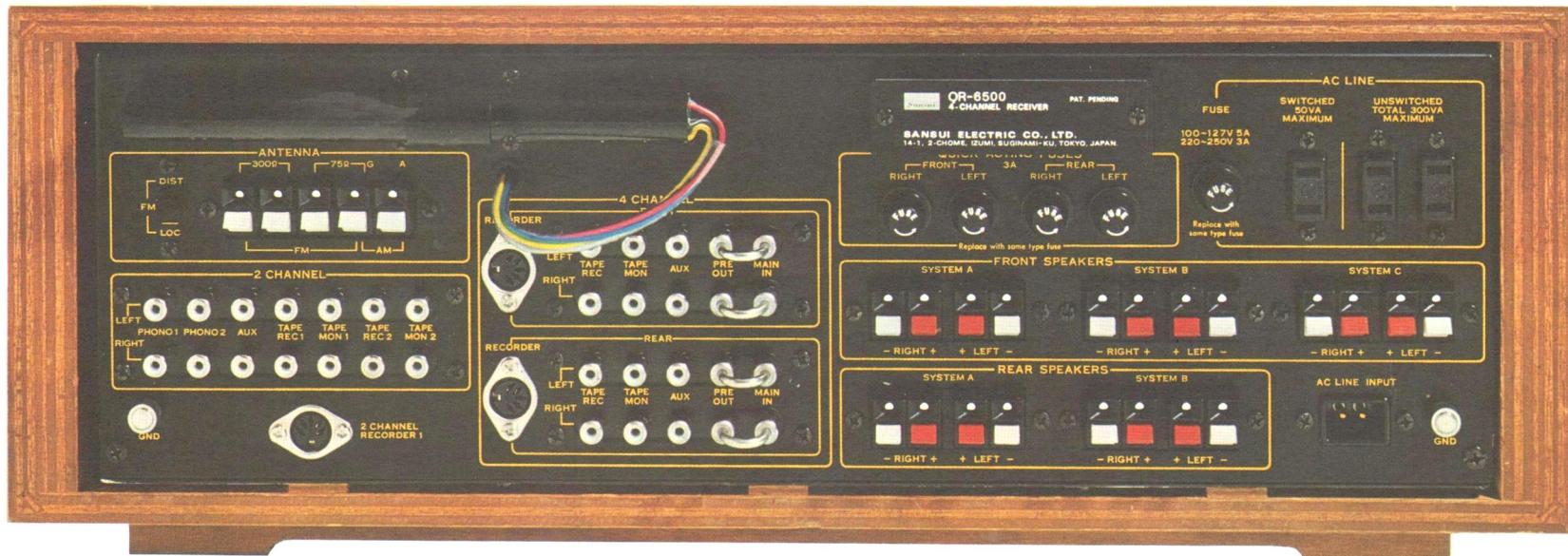


Ideal Positioning Method: Involves the use of six speaker systems and lets you choose the regular 2-2 or front 2-2 system by the simple changeover of the rear Speakers Switch.



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.



SPECIFICATIONS

POWER AMPLIFIER SECTION

POWER OUTPUT

Music Power (IHF)	280W	at 4Ω load
	190W	at 8Ω load
Continuous Power	50W×4	at 4Ω load
	37W×4	at 8Ω load

TOTAL HARMONIC DISTORTION

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

INTERMODULATION DISTORTION

POWER BANDWIDTH (IHF)

20 to 30,000Hz

FREQUENCY RESPONSE

(at normal listening level)
20 to 30,000Hz ±1dB

CHANNEL SEPARATION

better than 55dB
(at 1,000Hz, rated output)

HUM AND NOISE (IHF)

better than 70dB

INPUT SENSITIVITY

1V for rated output

INPUT IMPEDANCE

100KΩ

LOAD IMPEDANCE

4 to 16 ohms

DAMPING FACTOR

more than 30 at 8Ω load

PREAMPLIFIER SECTION

OUTPUT VOLTAGE

Maximum Output Voltage 3.5V

Rated Output Voltage 1V

TOTAL HARMONIC DISTORTION

less than 0.1% at rated

output Voltage

FREQUENCY RESPONSE

30 to 30,000Hz ±1dB

CHANNEL SEPARATION

better than 50dB
(AUX: 10kΩ, at 1,000Hz)

HUM AND NOISE (IHF)

better than 60dB

PHONO 1 and 2

better than 70dB

AUX

INPUT SENSITIVITY

(at 1,000Hz, rated output
voltage)

PHONO 1 and 2

2mV (50kΩ)

AUX (2CH)

150mV (50kΩ)

AUX (4CH)

410mV (50kΩ)

TAPE MON (pin) (2CH)

150mV (50kΩ)

TAPE MON (pin) (4CH)

410mV (50kΩ)

TAPE RECORDER (DIN) (2CH)

150mV (50kΩ)

TAPE REC (pin) (4CH)

410mV (50kΩ)

TAPE RECORDER

410mV (50kΩ)

(DIN) (2CH) 30mV
TAPE RECORDER
(DIN) (4CH) 90mV

EQUALIZER

PHONO

RIAA NF type

CONTROLS (Front and Rear)

BASS

+15dB -15dB at 50Hz

TREBLE

+15dB -15dB

LOUDNESS

at 20,000Hz
(volume control at -30dB)

LOW FILTER

+8dB at 50Hz, +3dB

HIGH FILTER

at 10,000Hz

SYNTHESIZER SECTION

FREQUENCY RESPONSE

Front Channel 20 to 20,000Hz ±1dB

Rear Channel 20 to 20,000Hz ±1dB

20 to 20,000Hz ±1dB

20 to 20,000Hz ±1dB

20 to 20,000Hz ±1dB

20 to 20,000Hz ±1dB

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20 to 20,000Hz ±1dB

20 to 20,000Hz ±1dB

IMAGE FREQUENCY REJECTION

250μV Ferrite bar Antenna

IF REJECTION

better than 50dB at 1,000kHz

SELECTIVITY

better than 80dB at 1,000kHz

SWITCHES

SELECTOR

PHONO-2, PHONO-1, FM
AUTO, FM MONO, AM, AUX
(2CH), AUX (4CH)

MODE

2-CHANNEL

REAR, FRONT, FRONT and
REAR

4-CHANNEL

NORMAL, RIGHT QUARTER
TURN, HALF TURN, LEFT
QUARTER TURN

SYNTHESIZER/DECODER

2 CHANNEL, CONCERT
HALL-1, CONCERT HALL-2,
SURROUND/DECODER

TAPE MONITOR-1 AND 2 (2CH)

SOURCE, PLAY BACK

TAPE MONITOR (4CH)

SOURCE, PLAY BACK

FM MUTING

ON, OFF

LOUDNESS

(Front and Rear)

OFF, ON

HIGH FILTER

(Front and Rear)

OFF, ON

LOW FILTER

(Front and Rear)

OFF, ON

SPEAKER SELECTOR

(Front)

OFF, SYSTEM-A, SYSTEM-B,
SYSTEM-C, SYSTEM-A+B,
SYSTEM-A+C

SPEAKER SELECTOR

(Rear)

OFF, SYSTEM-A, SYSTEM-B,
SYSTEM-A+B

FM ANTENNA SENSITIVITY SELECTOR

DISTANT, LOCAL

OTHER SPECIAL FEATURE

MW Ferrite Bar Antenna

SEMICONDUCTORS

Transistors: 93 FETs:4 Diodes:24

Zener Diodes:2 ICs:5 Modules:5

POWER REQUIREMENTS

POWER VOLTAGE

100V, 110V, 117V, 127V,

220V, 230V, 240V, 250V

POWER CONSUMPTION

470W (max. signal)

538mm (21³/₈")W×197mm

(7⁷/₈")H×362mm (14³/₈")D

22 kg (48.5 lbs.)

DIMENSIONS

WEIGHT