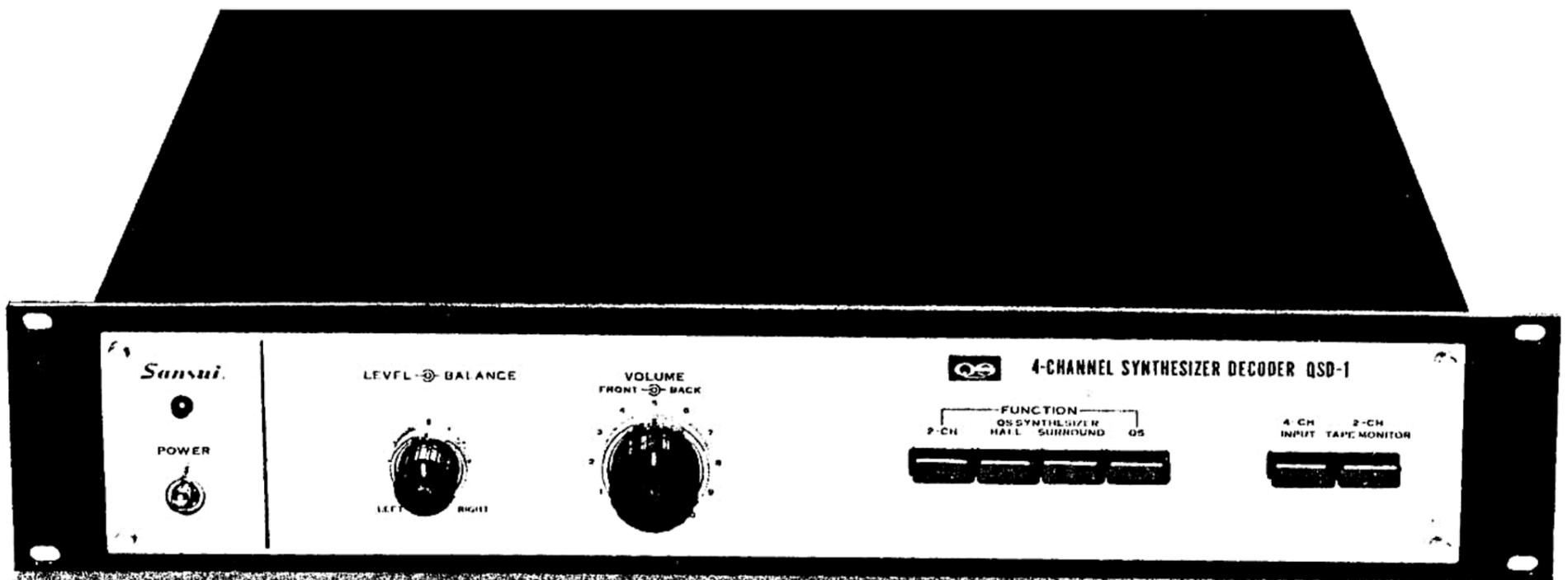


SANSUI

QSD1

PROFESSIONAL
QS 4-CHANNEL
DECODER/
SYNTHESIZER

QS
4 CHANNEL STEREO



Sansui

THE ULTIMATE DECODER/SYNTHESIZER

Three Type-A QS Vario-Matrix Decoders in One

Sansui's new QSD-1 is not for just any 4-channel fan. This extraordinarily advanced QS 4-channel decoder/synthesizer was created specifically for professional and semi-professional applications only. And like any fine audio instrument it deserves to be incorporated within a total system of the highest quality—from source components and preamplifiers right on through to power amplifiers and speaker systems.

The QSD-1 is the culmination of Sansui's original QS 4-channel technology for the discriminating audiophile. Thanks to its three separate QS vario-matrix decoders, each constructed of four custom-designed ICs and each responsible for a particular frequency band, it delivers unparalleled QS 4-channel decoding performance, plus the proven ability to produce musically accurate 4-channel sound signals from ordinary 2-channel sources.

It is the most technically advanced 4-channel matrix decoder and 4-channel synthesizer available to the consumer today. The following technical details will support this claim.

QSD-1 FEATURES AND PERFORMANCE

Distortion 0.1% or Less

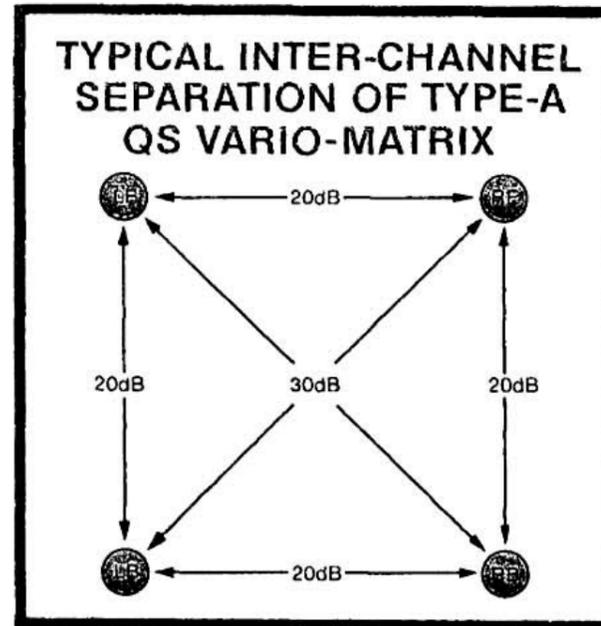
As numerous independent lab examinations have established beyond doubt, the QSD-1 delivers technical and musical performance equal to and in most cases far surpassing those of 2-channel. In terms of distortion, for instance, months of Sansui research and development have resulted in reducing the distortion factor to 0.1% or less at 1kHz (see graph), while at the same time actually extending dynamic range, frequency response and other measurable and unmeasurable criteria of tonal quality.

Inter-Channel Separation 20dB to 30dB

Effective separation of the sound signals in each of the four channels is vital to the believability of a 4-channel sound field. And today the Sansui QS System delivers this necessary separation—equal even to that produced by discrete 4-channel master tapes.

In theory the QS vario-matrix can be made to provide infinite inter-channel separation. In practical terms, the QSD-1, representing as it does the peak of the QS vario-matrix technique, offers a proven 20dB separation between adjacent channels and 30dB separation across the diagonally opposite channels. Prove it to

yourself. This means that the QSD-1 never compromises the 4-channel sound field concept. At the same time it ensures optimum tonal quality during the actual appreciation of music.



High-Performance QS Synthesizer

Your ears will tell you that what you have thought to be a myth is actually true. It is possible to derive a 4-channel sound field from ordinary 2-channel sources, and there is no more effective way to achieve this miracle than with the QS Synthesizer. The "synthesizer encoder" in the QSD-1 works together with the three separate QS vario-matrix decoders to derive the "hidden" or unexpressed phase relationships in conventional 2-channel records, tapes and FM stereo signals, and convert them into a multi-channel sound field. It differs greatly from other so-called "stereo expanders" in technical aspects as well as in actual performance effectiveness, and it offers two separate modes:

Surround: Sound images are clearly and distinctly located in each of the four channels with the same 20dB separation between adjacent channels as offered from a QS 4-channel source played through the QSD-1.

Hall: The 2-channel signals are reproduced through the front channels as in ordinary stereo, while the QSD-1 sends ambience signals to the back channels to result in the same kind of rich musical sound you would hear in a concert hall.

Professional Monitor Decoder Application

The QSD-1 is being applied at this very time to professional monitor decoder uses in recording studios and FM stations. It has the same design and standards as the expensive professional QS encoder

QSE-4/decoder QSD-4, and is easily mounted in the standard 19-inch (480mm) studio equipment rack.

Function Controls

In addition to the volume, level and balance controls, the QSD-1 has six front-panel pushbutton switches: four are for functions, including 2-channel, QS Synthesizer-Surround, QS Synthesizer-Hall, and QS decoding. The other two select 4-channel inputs and a 2-channel tape monitor.

TYPE-A QS VARIO-MATRIX TECHNOLOGY

Type-A QS Vario-Matrix Technique

The QS vario-matrix technique is a Sansui innovation to decode QS-encoded signals with the same high inter-channel separation as discrete 4-channel tape. It works this way:

When two sounds of different levels reach the human ears simultaneously from different directions, the ears are known to perceive the directionality of the louder sound very clearly. But their sensitivity to the directionality of the weaker is momentarily lost or weakened, resulting in an apparent broadening of location for that sound. The louder sound is masking the directionality of the weaker sound, and hence this phenomenon is called "directional masking."

Taking advantage of this, the QS vario-matrix circuit works to emphasize the directionality of the loudest sound at each moment, while broadening those of the weaker sounds. It does this by retrieving from the input encoded signals the information on the directionality of the loudest sound, creating signals that reflect this information. It then uses these signals to control the operating parameters of the decoding matrix in such a way that the latter will increase the separation of the channel containing the loudest sound at each moment, while reducing that of the other channels.

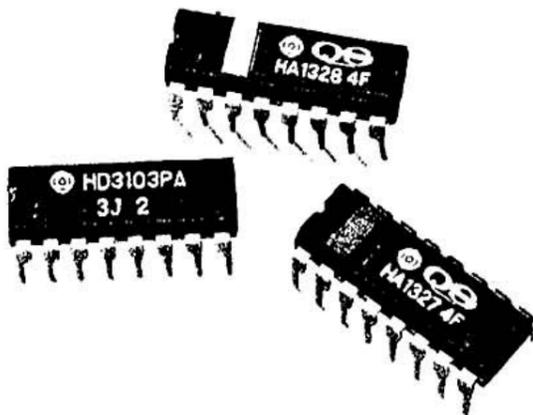
Note that this is a fundamentally different approach than the so-called gain control logic. In the latter, the gain (volume) of the playback amplifier is instantaneously adjusted to cancel the weaker sounds at each moment to achieve spurious separation for the loudest sound. In the QS vario-matrix circuit, however, only the directionality of the weaker sounds is broadened; all the weaker sounds, so very important in the original live sound field and so essential to recreate its full

ESIZER

musicality, are still reproduced in full with QS.

QS Vario-Matrix ICs

The QSD-1 incorporates peripheral discrete components and twelve custom-designed, Sansui-patented integrated circuits. The latter have been developed for mass production to assure the uniform performance of professional and consumer class Type-A QS vario-matrix decoders. The ICs are of three types:



Phase Discriminator IC (HA1327):

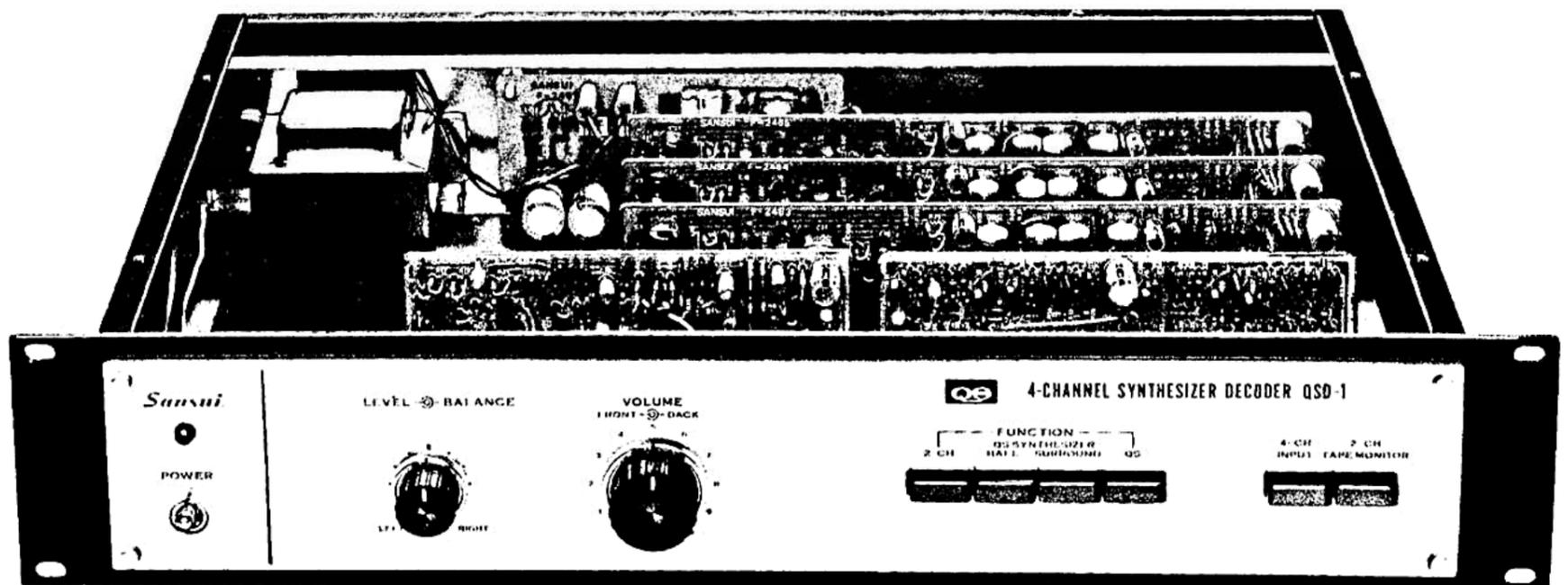
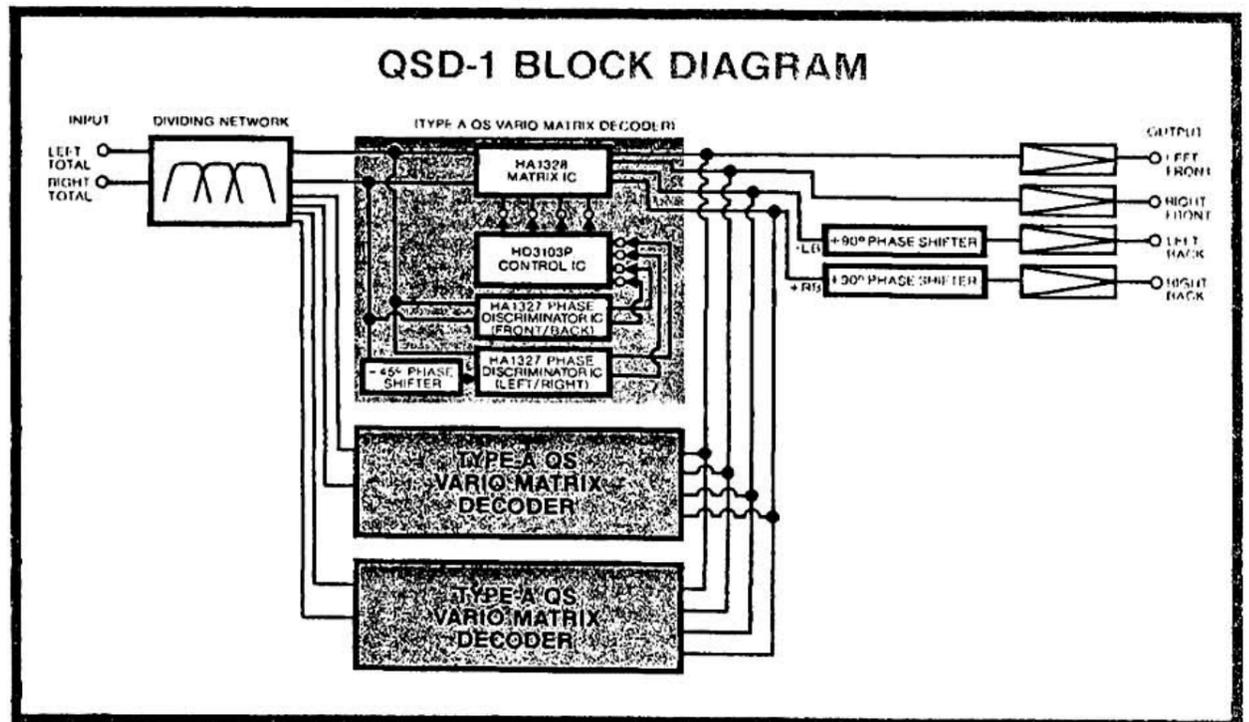
This IC, the equivalent of 43 transistors and 14 diodes, detects the directionality of the loudest sound via a phase-discrimination process of the input signals LT and RT. The signals it passes on to the control IC in turn control the matrix IC. In the QS vario-matrix circuit, two HA1327 ICs are used, one for the front-back and another for the left-right directions.

Control IC (HD3103P): This is a MOS FET array with five FETs. The IC's internal resistance changes when it receives the signal from the HA1327, and it subsequently delivers four control signals of different levels to the matrix IC.

Matrix IC (HA1328): This IC is the equivalent of 50 transistors. Its function is to de-matrix the input signals LT and RT (and to handle the signals encoded by the synthesizer encoder section when creating 4-channel sound from 2-channel sources) to deliver four output signals, the matrix configuration being controlled from instant to instant by the HD 3103P.

Three-band Type-A QS Vario-Matrix Circuit

Normally, a QS vario-matrix decoder (Type-A) contains four of these special ICs. In the QSD-1, however, twelve are used, forming three separate QS vario-matrix circuits, each devoted to handling a specific portion of the audio frequency spectrum. One is for the lows, another for the mid-ranges, and a third for the highs to ultra-highs. In this way the results achieved are truly professional in accuracy, since each circuit identifies and processes the loudest sound for maximum separation in its own band. This naturally means richer tonality and clearer sound image location overall.



SPECIFICATIONS

4-CHANNEL DECODER SECTION (TYPE-A QS VARIO-MATRIX)

FREQUENCY RESPONSE

20 to 30,000Hz
less than 0.1% (at 1,000Hz)

DISTORTION

SEPARATION

QS Decoder 20dB (adjacent channels)
30dB (diagonal channels)
QS Synthesizer equivalent to QS Decoder

INPUT SENSITIVITY

2-CHANNEL INPUT 100mV
TAPE MONITOR (2-ch) 100mV
4-CHANNEL INPUT 140mV
MAX. INPUT CAPABILITY

25V (LEVEL SET MINIMUM, THD 0.5%)

OUTPUT LEVEL

4-CHANNEL OUTPUT

300mV

NOISE LEVEL

less than 250 μ V
(LEVEL SET MAXIMUM)

GENERAL

SEMICONDUCTORS

35 Transistors, 16 Diodes,
1 Zener Diode, 12 ICs, 1 LED

POWER REQUIREMENT

VOLTAGE 100, 120, 220, 240V,

50/60Hz

CONSUMPTION 10 watts

DIMENSIONS

482mm (19") W
88.5mm (3½") H
304mm (12") D
6.6kg (14.6lbs.)
8.1kg (17.9lbs.) packed

WEIGHT

Design and specifications subject to change without notice for improvements.

