

# Technics SA-5600X

by Panasonic FM/AM 4-Channel/2-Channel Receiver





# SA-5600X

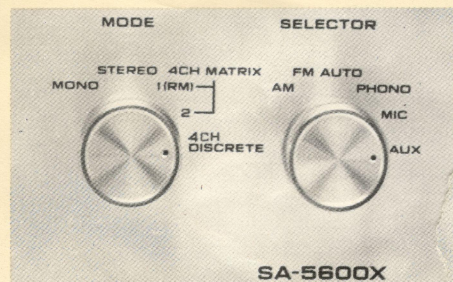
FM/AM 4-Channel/2-Channel Receiver

Devised for the budget-conscious music lover, Model SA-5600X 4-channel/2-channel receiver nevertheless embraces many of the premium-performance features, now characteristic of the entire Technics family. Its outstanding cost/performance ratio projects it above its competitive class with such features as OCL amplifier circuitry, 4-pole MOS FET in the FM front end and the total power availability in either 2-channel or 4-channel operation made possible by Balanced Transformer-Less (BTL) circuit design. There has been no economizing in the application of Technics technology.

## Total Discrete 4-Channel Capability

The 4-channel sound of the future—the near future—will be discrete. There are already some open-reel 4-channel tapes and numerous 8-track cartridges available, and CD-4 discrete disc recordings are now beginning to assert the superiority that will undoubtedly make them the predominant 4-channel source of the future.

The SA-5600X is ready for this situation, even ahead of it. It can handle every discrete 4-channel source now available or to come. Tape sources can be directly connected. The complementary Panasonic SE-405H CD-4 discrete-disc demodulator can be added simply. And a socket on the back panel provides direct access to the FM tuner circuitry for instant connection of an FM 4-channel accessory demodulator, whenever the Federal Communications Commission approves a method for broadcasting 4 discrete channels.



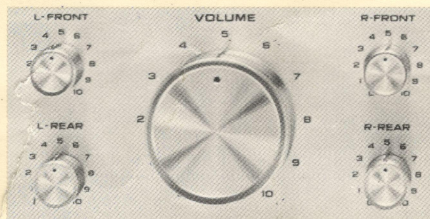
## Total Matrix 4-Channel Capability

A built-in decoder provides immediate recovery of the 4-channel mode from any matrixed program source, whether on disc recording or broadcast. Moreover, there is a real solution to the problem of matching different matrix systems. Instead of the usual single, compromise decoding network that does not quite decode any system accurately, there are two matrix positions on the mode switch to cover the full range of systems in use. MATRIX 1 matches the so-called Regular Matrix which embraces matrixed material available in the United States with the excep-



tion of sources encoded via Matrix 2. The MATRIX 2 position matches the method most widely used in the United States for disc recording. Necessary matrix phase shift is built into the decoder, so that no separate adjustment is required.

## Precise 4-Channel Balance, With Individual Level Controls For Each Channel



The startling, dynamic potential of 4-channel sound is best realized when the sound field is properly-balanced. Such balance is not automatically assured because it is affected by room conditions, speaker placement, musical content and individual taste. The SA-5600X facilitates optimum adjustment with a control arrangement that combines outstanding flexibility with ease of operation.

There are four individual level controls, one for each channel, grouped in a square around the main volume control so as to correspond to the normal pattern of speaker placement. With these, the output of each speaker may be adjusted to accommodate such variables as differences in sound character, efficiency between front and rear speakers, physical or acoustic variations in the room, departures from ideal speaker location and other problems. Once these relatively permanent adjustments have been achieved, the master level control may be used for all channels simultaneously, without upsetting the carefully established relationship among all four speakers.

In addition, the user may wish to alter overall balance temporarily to correspond to his position in the room (without having to confine himself to the precise center of the sound field). He may then wish to restore normal balance. This is readily accomplished with the simple addition of the Optional Remote Balance Control, Model SH-1010, which plugs directly into a back-panel jack. With this single-lever "joystick" type of control, the balance can be temporarily tilted to favor any direction. It can also be used for such dramatic effects as "walking" the sound around the listening area.



Optional Remote Balance Control, SH-1010

## Multiple Tape Monitors With Dubbing Capability

Complete input/output connections for two 4-channel tape decks, with monitoring, actually make it possible to hook up three decks altogether. The AUX input may be used for the third. In addition, dubbing—tape-to-tape copying—is easily achieved with the SA-5600X.

## Total "Balanced Transformer-Less (BTL)" Power Output For 2 Or 4 Channels

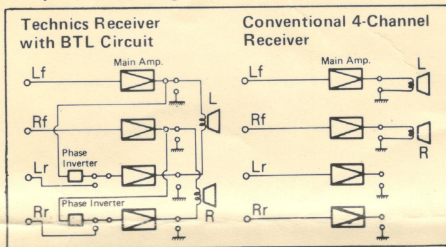
One of the leading problems for audiophiles during the transitional era from 2-channel stereo to 4-channel reproduction is solved by Technics' BTL circuit design in the amplifier's power output stages.



Most 4-channel receivers, when used in the conventional 2-channel stereo mode with two speakers, employ the power capability of the front amplifiers only. This means that the foresighted listener, who has prepared for the future with a 4-channel receiver although he is only set up for 2-channel stereo today, cannot use the full power his receiver can generate. Amplifiers for the two rear channels are left idle.

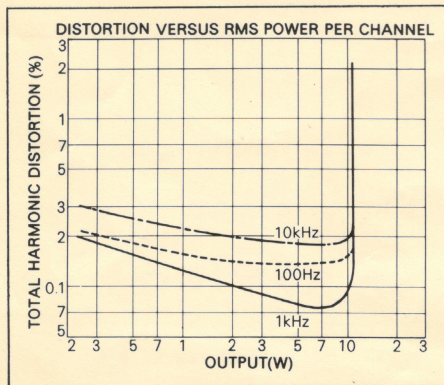
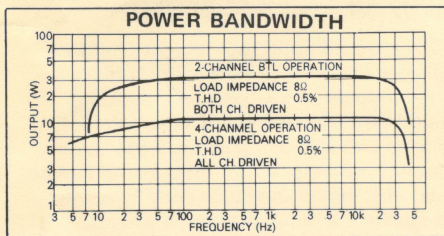
With BTL design, a flick of a switch connects each rear amplifier channel with its corresponding front amplifier in such a way that total power output is more than doubled. Not a single watt of capability is wasted. To put it another way: Although the SA-5600X is designed for outstanding 4-channel performance, it is also a first-rate choice as an uncompromised, top-quality 2-channel receiver.

Another advantage while the receiver is used in a 2-channel system: Connections are simple for driving two sets of stereo speakers.



### All-Stage Direct-Coupled OCL Output Circuitry, Including Differential Amplifier

Conventional power amplifiers drive speakers indirectly, through coupling capacitors, to prevent direct current in the amplifier's output from getting into the speakers and causing distortion or even damage. Unfortunately, the capacitors block not only direct current, but also low frequencies. Technics' OCL (output capacitorless) design uses a first-stage differential amplifier to stabilize the entire circuit that cancels all DC



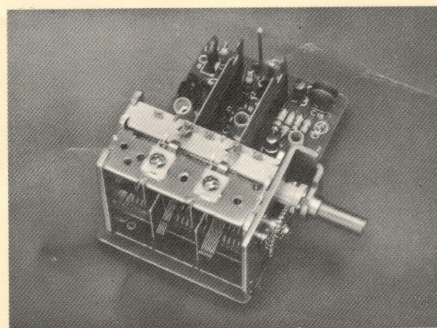
at the output point, making it possible to feed the speakers directly. The resultant all-stage, direct-coupled design produces a clear crisp bass, firm and well-controlled, yet rich and full-bodied, as would be expected with a power bandwidth rating that extends down to 7 Hz.

OCL design also maintains low-frequency damping. Most modern amplifiers can claim very good damping factors—as long as this factor is measured at the usual checkpoint frequency of 1,000 Hz. The customary coupling capacitor, however, drastically reduces damping in the low bass, where it is most needed. With OCL design, full damping is maintained throughout the audible low-frequency range.

### Universal Phono Equalizer Features Wide Dynamic Range, Low Noise And Low Distortion

Many phono preamp/equalizer circuits are optimized for low-level or high-level cartridges, but not for both. Technics uses a two-stage direct-coupled PNP-NPN configuration that keeps noise extremely low (S/N ratio is 70 dB) and has an exceptional dynamic range. It can handle unusually weak signals without losing them in noise and exceptionally strong signals without overloading. Thus it can comfortably accommodate any phono cartridge known today. Also DC negative feedback from the second to the first stage keeps bias stability under control, rendering the equalizer immune to temperature fluctuations.

### Sensitive, Performance-Packed Tuner Section

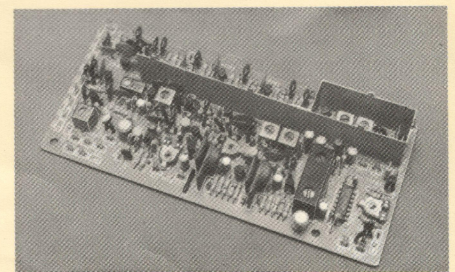
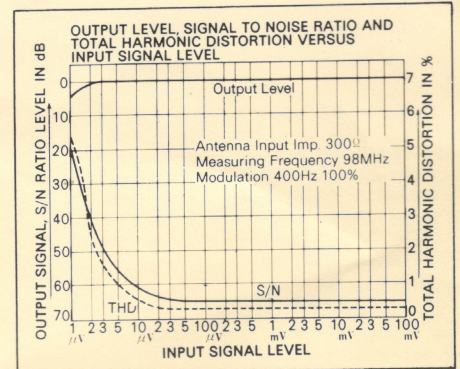


4-pole MOS FET, the most sophisticated transistor available for FM front-end use today, and linearly variable tuning capacitors are featured in the tuner design of the SA-5600X. This high-input-impedance transistor paves the way for high gain, high sensitivity (1.9  $\mu$ V, IHF), and outstanding signal-to-noise ratio. The linearly variable tuning capacitors make pinpoint tuning accuracy easy.

### 6-Element Ceramic Filters For Ultra-Selectivity

There are no performance compromises so that FM and AM circuitry may be shared: completely separate FM and AM sections assure peak performance in each case. Three 2-element ceramic filters and 5-stage amplifier circuits, combined with 3-stage differential amplifiers, assure top-notch performance. FM selectivity is 65 dB,

signal-to-noise ratio is 65 dB.



### New FM MPX Design

A newly developed epoxy coil assembly and a monolithic IC combine to yield exceptional separation on FM stereo with immunity to the performance-impairing effects of high temperature and humidity.

### Positive-Action FM Muting

A quick-acting, positive muting circuit eliminates inter-station hiss without the frequently encountered transitional noise as it goes from the muted to non-muted condition, when signal is tuned.

### OTHER FEATURES

#### MICROPHONE INPUT JACK.

FM MPX JACK for quick connection of future 4-channel FM adapter.

2 HEADPHONE JACKS permit front-rear connection of 4-channel headphones or two sets of 2-channel headphones.

#### LARGE TUNING METER.

FM AND AM LINEAR DIAL SCALES for precise, easy tuning on both bands.

#### LOUDNESS SWITCH.

2CH/4CH INDICATOR illuminates when mode is chosen.

BLACKOUT TUNING DIAL glows attractively in the distinctive Technics' green-blue color.

QUICK-CONNECT TERMINAL FOR REMOTE BALANCE CONTROL—the control is an optional extra.

PILOT LAMP BUILT INTO POWER ON/OFF BUTTON

2 AC OUTLETS (1 switched, 1 unswitched)

FULL ANTENNA FACILITIES include built-in AM ferrite bar and 300-ohm/75-ohm FM terminals.

WALNUT CABINET WITH CHAMPAGNE GOLD FRONT PANEL.



# Specifications

## Amplifier Section

1 kHz RMS (Continuous) Power		22.5w/22.5w/22.5w/22.5w (4Ω)
4-channel operation	each ch. driven	15w/15w/15w/15w (8Ω)
	all ch. driven	14w+14w+14w+14w (4Ω)
		11w+11w+11w+11w (8Ω)
		41w/41w (8Ω)
		31w/31w (8Ω)
20 Hz~20 kHz RMS (Continuous) Power		8.5w+8.5w+8.5w+8.5w (8Ω)
4-channel operation	all ch. driven	25w+25w (8Ω)
2-channel BTL operation	both ch. driven	108w (4Ω)
IHF Music Power	4-channel operation	108w (8Ω)
	2-channel BTL operation	0.5%
Total Harmonic Distortion		0.7%
Intermodulation Distortion		0.7%
(60Hz: 7kHz = 4:1, SMPTE)		
Power Bandwidth (all ch. driven at 8Ω)		7 Hz~30 kHz, -3 dB
Frequency Response		RIAA standard curve ±1 dB
PHONO		10 Hz~50 kHz, $+0$ dB
AUX		-3 dB
Residual Hum & Noise		1.5 mV
S/N Ratio (IHF, A)		
PHONO		70 dB
AUX		90 dB
Damping Factor		30 (8Ω)
Input Sensitivity & Impedance		
PHONO		2 mV/50 kΩ
AUX		180 mV/40 kΩ
MIC		3 mV/50 kΩ
Tone Controls		
BASS		50 Hz, +10 dB -10 dB
TREBLE		10 kHz, +10 dB -10 dB
Loudness Control (volume at -30 dB)		50 Hz, +10 dB
Tape Monitor 1,2		
PLAYBACK		180 mV/40 kΩ
REC OUT		180 mV
Load Impedance	4-channel operation	4~16Ω
	2-channel BTL operation	8~16Ω

## FM Tuner Section

Frequency Range	88~108 MHz
Sensitivity	1.9 μV
Alternate Channel Selectivity	65 dB
Total Harmonic Distortion	
MONO	0.3%
STEREO	0.4%
S/N Ratio	65 dB
Frequency Response	20 Hz~13 kHz, ±1 dB
Image Rejection (at 98 MHz)	55 dB
IF Rejection (at 98 MHz)	60 dB
Spurious Response Rejection (at 98 MHz)	60 dB
Capture Ratio	1.8 dB
AM Suppression	50 dB
Stereo Separation (at 1 kHz)	40 dB
Leak Carrier	50 dB

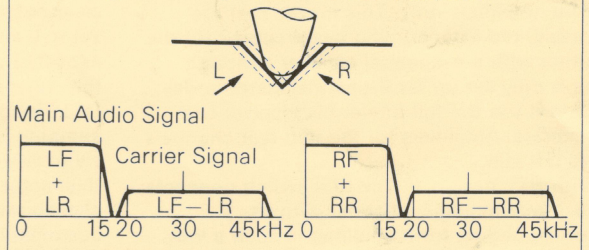
## AM Tuner Section

Frequency Range	520~1610 kHz
Sensitivity	20 μV
Selectivity	25 dB
Image Rejection	40 dB
IF Rejection	40 dB

## General Specifications

Power Consumption	150w
Power Supply	AC 120V 60Hz
Dimensions (overall) H×W×D	5 $\frac{3}{8}$ "×16 $\frac{1}{8}$ "×15 $\frac{5}{8}$ "
Weight	24 lb.

## Signal Configuration of CD-4 Record



## What is CD-4?

The CD-4 (Compatible Discrete 4-Channel) System is a technique developed for inscribing four separate and distinct channels in the single groove of a conventional phonograph record. Rear signals combine with front signals in such a way (left rear with left front, and right rear with right front) so that, when the disc is played back on conventional 2-channel stereo equipment, two balanced and natural-sounding channels (total left and total right) are reproduced. This reproducibility in conventional stereo (or in monophonic sound, for that matter) is what makes the system compatible. A carrier signal is added, much as in FM stereo broadcasting. This contains the "separation information" needed to recover the four original channels.

Although Technics components are fully equipped to perform with any 4-channel system now available or anticipated, we believe the CD-4 system to be the system of the future for recording because of its superior performance.



## Demodulator Model SE-405H

Play back any CD-4 recording in four vibrant channels through this high-performance demodulator. It includes a Panasonic semiconductor high-frequency cartridge with the new celebrated Shibata stylus, which mounts in any standard tone arm and can play back any 4-channel or standard 2-channel stereo record with superb fidelity. Other features: carrier indicator pilot light, switch-selected auxiliary input and built-in phono equalizer-preamp for four channels.

# Technics

by Panasonic

## MATSUSHITA ELECTRIC CORP. OF AMERICA

CONSUMER ELECTRONICS DIVISION EXECUTIVE OFFICES/Pan Am Bldg., 200 Park Ave., New York, N.Y. 10017. (212) 973-5700

PANASONIC NEW YORK, 43-30 24th St., Long Island City, N.Y. 11101. (212) 973-5700

PANASONIC BALTIMORE, 11 Azar Court, Baltimore, Md. 21227. (301) 247-4300

PANASONIC CHICAGO, 363 N. Third Ave., Des Plaines, Ill. 60016. (312) 299-7171

PANASONIC ATLANTA, 1 Meca Way, Duluth, Georgia 30136. (404) 448-1100

PANASONIC DALLAS, 4415 Simonton Road, Dallas, Texas 75240. (214) 233-5721

NEWCRAFT INC., 8383 Wilshire Blvd., Beverly Hills, Calif. 90211. (213) 655-5160

PANASONIC DE PUERTO RICO, Shelley Industrial Park, San Marcos Ave., Ext. El Comandante, Carolina, Puerto Rico 00630. (809) 769-4320

MATSUSHITA ELECTRIC OF HAWAII, INC., 320 Waiakamoi Road, Honolulu, Hawaii 96817. (808) 847-5361

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