

Technics
by Panasonic

SA-700

FM/AM Stereo Receiver

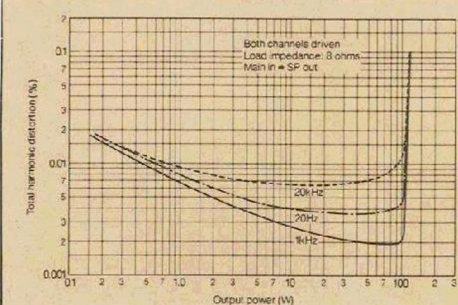


100 watts per channel
minimum continuous "RMS" into 8 ohms,
both channels driven, from 20-20,000 Hz, with
no more than **0.04%** total harmonic distortion.

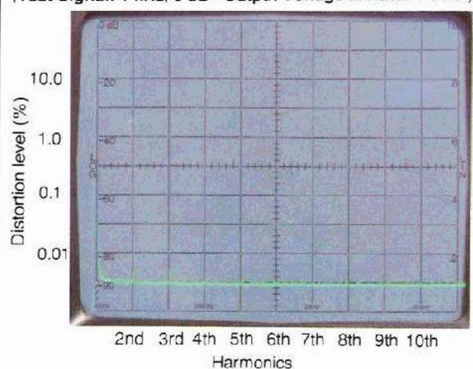
SA-700 FM/AM Stereo Receiver

The sound and performance of the SA-700 are just as spectacular as its specifications suggest. It also incorporates a very generous array of features, including Technics' new Acoustic Control, two-way tape dubbing, and peak-power LED's. And with this superb combination of performance and features, it is offered at a reasonable price. The SA-700 is both an audiophile-class component and an incredible value.

Output Power vs Total Harmonic Distortion



Power Output Distortion Spectrum
(Test Signal: 1 kHz, 0 dB - Output Voltage at Rated Power)



100 watts per Channel

The SA-700 is capable of generating 100 watts per channel, minimum continuous power into 8 ohms, from 20–20,000 Hz, with no more than 0.04% total harmonic distortion (measured per FTC standards). On a short-term (rather than continuous) basis, it can put out more than its rated power without clipping, enabling it to faithfully render high-amplitude musical peaks.

0.04% Total Harmonic Distortion

In the past, 0.04% total harmonic distortion at full power was found usually only in the best separate power amplifiers. But now, thanks to increasingly advanced technology, Technics has brought this level of performance to receivers. Naturally, this required very careful design of every stage affecting the power amplifier's performance.

Large, well-regulated power supply

Use of a large, low-impedance power transformer contributes to the SA-700's excellent stability under highly dynamic conditions. Two 15,000 μ F electrolytic capacitors are employed, one on each side of the power supply, to maintain regulation and provide reserve power for handling high-intensity musical peaks and deep-bass signals.

Current-mirror loaded differential stage

In the differential stage, current-mirror loading doubles signal gain without increasing noise and distortion. A single-packaged transistor pair is employed because of its precise thermal tracking under changing ambient temperature conditions.

Parallel push-pull, pure complementary output stage

Four high-power transistors are used in each channel in a parallel push-pull, pure-complementary configuration. The output stage is of course OCL (output capacitor-less) which helps to achieve tight, low-distortion deep bass response.

Quality control and circuit techniques

Large-scale, intensive analysis is continually conducted in Technics' labs to discover the best and most efficient circuit configurations, whether in discrete or IC formats. And when electronic elements of specific values and tolerances are needed, Technics can design them to exact standards and maintain strict quality control in their manufacture. To a very large extent, such extensive research and sophisticated manufacturing facilities make it possible for us to design and produce a superb power amp like the SA-700's, while keeping cost to the consumer low.

Phono Equalizer Stage—Accuracy Combined with Very Wide Dynamic Range 95 dB S/N Ratio

With a reference signal of 10 mV, the phono signal-to-noise ratio is an extraordinary 95 dB (IHF, A). Which means that for all practical purposes, the circuit is silent. It is made possible largely by the use of a Technics developed low-noise transistor (M47LP), which has the noise-reduction properties of several conventional transistors connected in parallel. Maximum input at 1 kHz, RMS is 200 mV. This voltage-handling capacity is aided by use of a separate positive/negative power supply for the phono stage. It is unlikely that even the most sensitive magnetic cartridges will overload the phono section. Finally, RIAA equalization is kept within a tolerance of ± 0.2 dB, thanks to use of 1% tolerance metal-film resistors and 2% tolerance polypropylene capacitors.

Acoustic Control

The SA-700's Acoustic Control combines the functions of low-distortion Baxandall-type bass, midrange and treble controls with "Boost/Filter" switches for the bass and treble ranges. Together, these controls give much greater flexibility in tone-tailoring than is possible with conventional tone controls:

Low and High Boost/Filter Switches

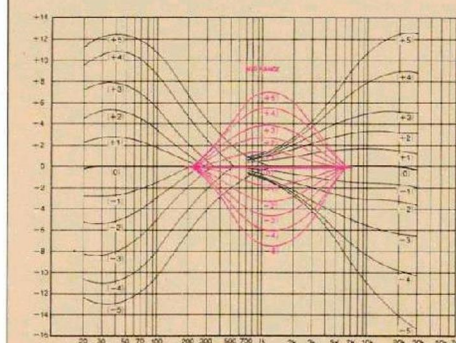
With the bass control left "flat", the "low boost" switch injects a peak at about 100 Hz which accentuates drums and bass instruments. Then, if you adjust the bass control, the location and amplitude of the peak changes. You can therefore get a very wide range of bass tonalities. The "high boost" creates a shelved response in the upper midrange and treble, which brightens the overtones of voices and instruments. Again, adjustment of the regular treble control with

further change tone balance in this range. In the filter positions, 6 dB/oct roll-offs are created, beginning respectively at 100 Hz and 7 kHz. You would use these to suppress subsonic signals from warped records, or high-frequency noise in the program material.

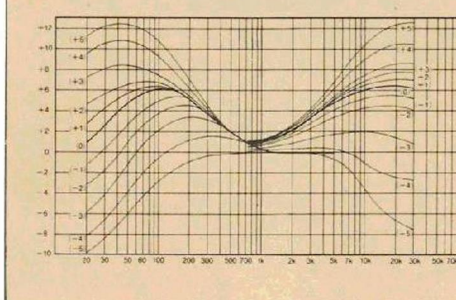
Combinations

You can use any of these controls independently, or none at all if you wish. But very often, you'll find that you can achieve subjectively better sound with combinations of settings—e.g. high "boost" in, regular treble control decreased. The chart below will give you an idea of the possibilities.

Normal Tone Control Response



Tone Control Response with Low and High "Boosts" ON



LED Peak-Power Indicators

A string of 24 LED's, 12 per stereo channel, illuminate to indicate peak power output being generated by the receiver. LED's were used instead of mechanical power meters because they are faster-acting, and can therefore give a more accurate indication of power peaks. For higher power levels, orange and red lights are used. When the red lights are flashing, this indicates that you are approaching clipping levels, so care should be taken with any further increase in volume. By using the range switch, you can cause the LED's to read ten times the level actually being generated. At this more sensitive setting, channel balance and separation can be readily checked. And even when you're not using the LED's for a specific purpose, you can still enjoy their beautiful visual effect.



Protection Circuitry

If DC voltage should appear at the speaker terminals, relays isolate the speakers from the circuit and green LED on the front panel goes out. Fuse protection is provided against damage from dangerously low speaker impedance or short-circuits in the speaker connections.

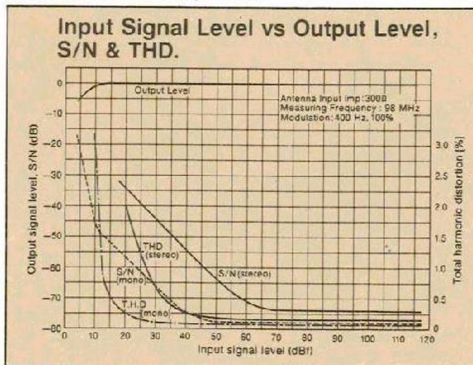
Amp/Preamp Convenience and Operating Features

- Two tape monitors with two-way dubbing. You can connect two tape decks to the SA-700, or add external processors such as an equalizer. When two decks are connected, you can record from either deck to the other. And you can listen to another sound source (such as a record or the tuner) while dubbing is in progress.
- Pre-Out/Main-In terminals. Permits separate use of preamplifier or power amplifier sections. External processors can be placed here to avoid using up a tape monitor.
- Main and remote speaker connections.
- Stereo/mono mode switch.
- Loudness switch.
- Front-panel programme-source indicators.
- Click-stop volume, balance and tone controls.
- "Pop-Noise Muting" eliminates pops or thumps in speakers when power is turned on or off.

TUNER SECTION

MOS FET FM Front End

A 4-pole dual-gate MOS FET is used for RF amplification. Not only does this MOS FET exhibit the usual qualities of high sensitivity and high tolerance to strong signals; it is extremely low-noise as well (noise figure of less than 4.5 dB) with low internal capacitance (less than 0.05 pF). A junction FET is used as a buffer between the mixer and local oscillator to prevent mutual interference between them. The front end elements are contained in a 4-gang linearly variable tuning capacitor which achieves superb sensitivity, selectivity, quieting and interference rejection.



IF Stage Employing "Flat Group Delay" Ceramic Filters

The five-stage IF section includes three 2-element "Flat Group Delay" ceramic filters. These filters contribute significantly to the

tuner's 80 dB selectivity. At the same time, they exhibit excellent phase characteristics, which is important for audio quality, particularly in the high frequencies. Differential amplifiers, incorporated into high-linearity IC's provide uniform gain and excellent AM suppression.

High-Linearity Quadrature Detector

A high-linearity quadrature detector with broad peak-to-peak range plays a key role in obtaining wideband, linear frequency response and low distortion. It can easily handle excessively modulated broadcast signals (up to 3 times the modulation levels permitted by the DOC) without significant distortion or loss of high frequencies. This wide tolerance assures linear operation with virtually any signal you're likely to receive.

Phase-Locked-Loop (PLL) Multiplex Stage

A PLL IC keeps the switching signals generated by the tuner in precise phase with the pilot and subcarrier signals generated by the broadcast station. The result is very stable FM Stereo performance, with wide separation maintained well into the high audio frequencies for a very striking stereo image. The PLL helps maintain low distortion as well, and its performance will not deteriorate with changing ambient temperature and humidity conditions, or the passage of time. Use of an IC removes the need for periodic realignment of the MPX stage.

FM Frequency Response: 20-15,000 Hz, +0.2, -0.8dB

Painstaking attention to circuit design enables

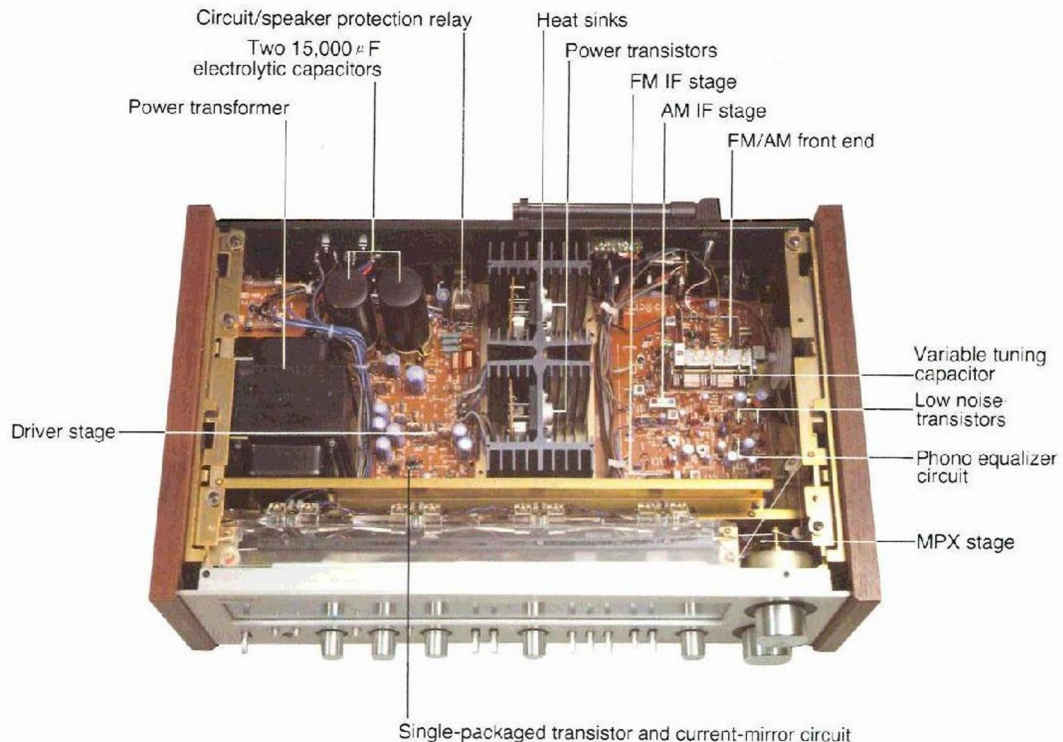
the SA-700's FM Tuner to achieve a very wide, flat frequency response—nearly ruler-flat over the standard FM audio frequency bandwidth. Its excellent high-frequency extension is partially attributable to use of a Chebyshev-type low-pass filter which suppresses the 19 kHz pilot signal by 65 dB, yet has a very minimal effect in the highest audio frequencies. At 15 kHz, response is down only 0.8 dB, and time-delay is an insignificant 5.5 micro-seconds at this point.

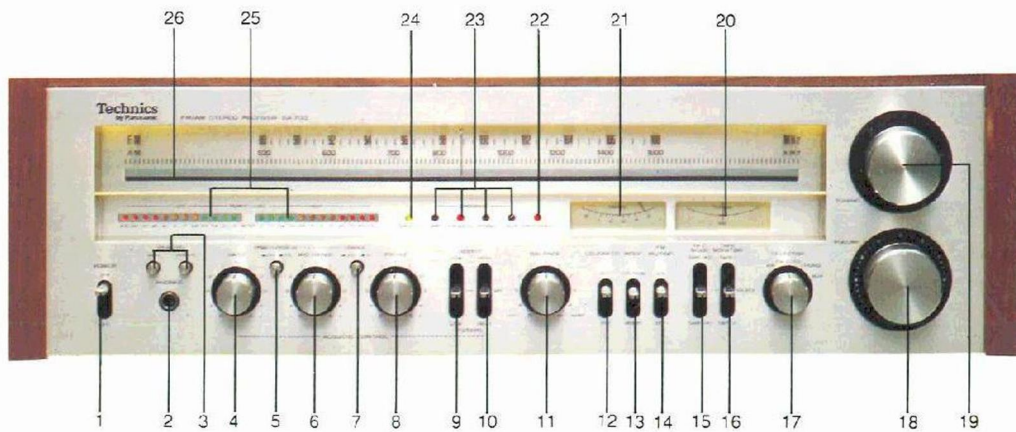
Quality AM Section with IC

Although you will probably prefer FM for serious listening, you can also expect good AM performance from the SA-700. Most of the important circuitry is incorporated into a reliable IC. Triple-tuned coils in the IF section provide good selectivity. While AM won't match FM in terms of clarity and frequency response, the SA-700's AM section will nonetheless provide very good performance.

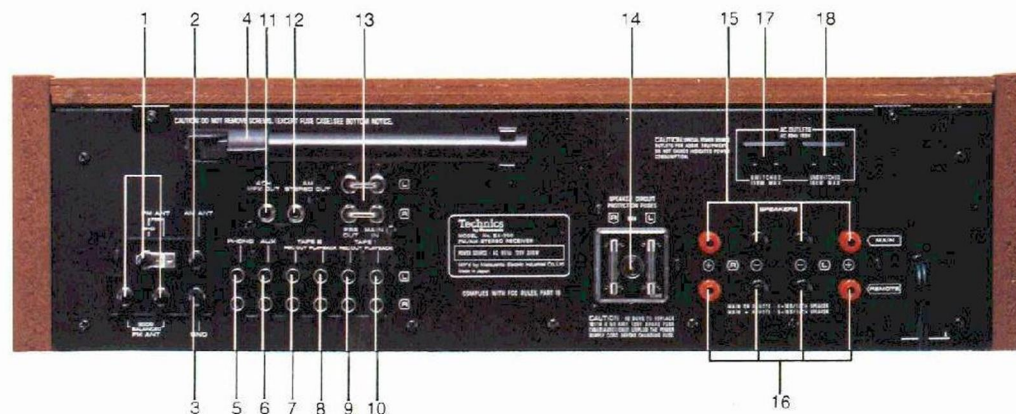
Tuner Convenience and Operating Features

- Mirror-reflection FM/AM tuning scale and smoothly operating flywheel dial facilitate pin-point tuning.
- Two tuning meters: signal-strength for FM and AM, centre-of-channel for FM. Unlike many signal-strength meters, the SA-700's shows maximum readings only with very strong (65 dBf) signals. This makes it an excellent aid for orienting your antenna.
- FM muting. Double-muting action, applied both in the IF stage and after the MPX stage, provides smooth transition between mute and non-mute conditions, without the loud thumps often heard in muting circuits.
- Jacks for adding future FM quad and AM Stereo adaptors.
- Terminals for 75 and 300 ohm FM antennas, and AM bar antenna.





1. Power on/off switch
2. Headphone jack
3. Speaker selectors (main, remote)
4. Bass control
5. Power indicator on/off switch
6. Midrange control
7. Power indicator range selector ($\times 0.1$, $\times 1$)
8. Treble control
9. Low boost/filter switch
10. High boost/filter switch
11. Balance control
12. Loudness switch
13. Mode selector (stereo/mono)
14. FM muting switch
15. REC mode selector
16. Tape monitor switch (Tape 1, 2)
17. Programme selector
18. Volume control
19. Tuning control
20. FM centre-of-channel tuning meter
21. Signal strength meter
22. FM Stereo indicator
23. Programme indicators
24. Safety indicator
25. LED peak-power indicator
26. FM/AM tuning dial



1. FM antenna terminals (75Ω , 300Ω)
2. AM antenna terminal
3. Ground terminal
4. AM ferrite bar antenna
5. Phono inputs
6. AUX inputs
7. Tape deck 2 REC outputs
8. Tape deck 2 PLAY inputs
9. Tape deck 1 REC outputs
10. Tape deck 1 PLAY inputs
11. 4ch MPX output
12. AM Stereo output terminal
13. Pre-out/main-in terminals
14. Speaker/circuit protection fuses
15. Speaker terminals (main)
16. Speaker terminals (remote)
17. AC outlet (switched)
18. AC outlet (unswitched)

Technical Specifications

POWER AMPLIFIER SECTION

Rated minimum sine wave
RMS power output
20 Hz~20 kHz
both channels driven
0.04% total harmonic distortion
100W per channel (8 ohms)
110W per channel (4 ohms)
1 kHz continuous power output
both channels driven
0.04% total harmonic distortion
110W per channel (8 ohms)
120W per channel (4 ohms)
Total harmonic distortion 0.04% at rated power
(20 Hz~20 kHz, 8 ohms, 4 ohms)
0.015% at half power
(20 Hz~20 kHz, 8 ohms)
0.025% at half power
(20 Hz~20 kHz, 4 ohms)
0.005% at half power
(1 kHz, 8 ohms, 4 ohms)
Intermodulation distortion 0.04%
Frequency response 5 Hz~90 kHz,
-1 dB
S/N (IHF, A) 112 dB
Residual hum & noise 0.4mV
Damping factor 50 (8 ohms) 25 (4 ohms)
Input sensitivity and impedance 1V/100 kilohms
Load impedance
MAIN or REMOTE 4~16 ohms
MAIN+REMOTE 8~16 ohms

PREAMPLIFIER SECTION

Input sensitivity and impedance
PHONO 2.5mV/47 kilohms

AUX 150mV/47 kilohms
TAPE 1, 2 PLAYBACK 150mV/47 kilohms
PHONO maximum input voltage
(1 kHz, RMS) 200mV
S/N (IHF, A)
PHONO 95 dB (at 10mV)
83 dB (at 2.5mV)

AUX 95 dB
Frequency response
PHONO RIAA standard curve ± 0.2 dB
AUX 20 Hz~20 kHz +0 dB, -0.3 dB
10 Hz~40 kHz -1 dB

Tone controls
BASS 50 Hz, +12 dB~-12 dB
MID 1 kHz, +7 dB~-7 dB
TREBLE 20 kHz, +12 dB~-12 dB

Acoustic control (at tone "0" position)
LOW BOOST 100 Hz, +6 dB
HIGH BOOST 10 kHz, +6 dB
Low filter 100 Hz, -6 dB/oct.
High filter 7 kHz, -6 dB/oct.

Loudness control
(volume at -30 dB) 50 Hz, +9 dB

Output voltage and impedance
PRE OUT rated 1V/4.7 kilohms
maximum 3V/4.7 kilohms

TAPE 1, 2 REC OUT 150mV

FM TUNER SECTION

Frequency range 88~108 MHz
Sensitivity 10.3 dBf (1.8 μ V IHF '58)
50 dB quieting sensitivity
MONO 13.2 dBf (2.5 μ V IHF '58)
STEREO 36.2 dBf (35.4 μ V IHF '58)
Total harmonic distortion
100 Hz 0.15% (mono), 0.3% (stereo)
1 kHz 0.1% (mono), 0.2% (stereo)

6 kHz 0.3% (mono), 0.4% (stereo)
S/N MONO 77 dB
STEREO 73 dB
Frequency response 20 Hz~15 kHz,
+0.2, -0.8 dB

Alternate channel selectivity 80 dB
Capture ratio 1.0 dB
Image rejection at 98 MHz 85 dB
IF rejection at 98 MHz 100 dB
Spurious response rejection at 98 MHz 100 dB
AM suppression 60 dB
Stereo separation
1 kHz 45 dB
10 kHz 35 dB
Carrier leak -65 dB (19 kHz)
-70 dB (38 kHz)
Antenna terminals 300 ohms (balanced)
75 ohms (unbalanced)

AM TUNER SECTION

Frequency range 525~1605 kHz
Sensitivity 30 μ V, 250 μ V/m
Selectivity 35 dB
Image rejection at 1000 kHz 50 dB
IF rejection at 1000 kHz 45 dB

GENERAL

Power consumption 590VA
Power supply AC 120V 60 Hz
Dimensions 16.7 $\times$ 55.2 $\times$ 39.3 cm
(6 $\frac{9}{16}$ " $\times$ 21 $\frac{5}{8}$ " $\times$ 15 $\frac{3}{8}$ ")
(H $\times$ W $\times$ D)
Weight 18 kg (39.7 lbs.)
Walnut grain cabinet finish

Technics

by Panasonic

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"Panasonic and Technics by Panasonic are two of the most trusted brand names in electronics. Matsushita Electric (makers of Panasonic and Technics products), celebrated its 60th anniversary in 1978 and currently employs more than 100,000 people around the world, who are responsible for better than 10,000 products sold in over 130 countries. These products are the achievements of 17 research laboratories and the additional research and development facilities of each manufacturing department in the Matsushita Consolidated Group, having a technical team of about 10,000 research engineers and scientists. Actual production is accomplished at some 150 factory complexes in various countries, including Canada. Our multi-national organization holds over 49,000 patent rights and is very proud to have earned a global reputation for product quality."

Dimensions and weight shown are approximate.

Specifications subject to change without notice.

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