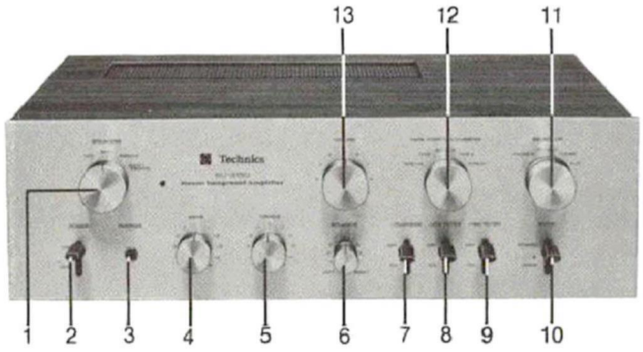
Technics ST-3150/SU-3150

FM/AM Stereo Tuner

Stereo Integrated Amplifier

SU-3150 Stereo Integrated Amplifier



1. Speaker selector
2. Power on/off switch
3. Headphones jack
4. Bass control
5. Treble control
6. Balance control
7. Loudness switch
8. Low filter switch
9. High filter switch
10. Mode switch
11. Program selector
12. Tape monitor switch
13. Volume control

In its basic design concept and in all essential circuit details, the SU-3150 closely follows the avenues of thought laid down in—and the resultant excellence in performance achieved with—our highest priced amplifiers. Its power rating is typical of home use requirements, and the greatest possible care has been taken to assure truly "musical" behavior: circuit design attaches the greatest importance to *dynamic* performance, the way of handling the complex signals of music programs rather than the simple sine waves used in standard lab tests. Naturally, the SU-3150 gives you full control capabilities and the "aerospace feel" of switches and controls that Technics is justly famous for.

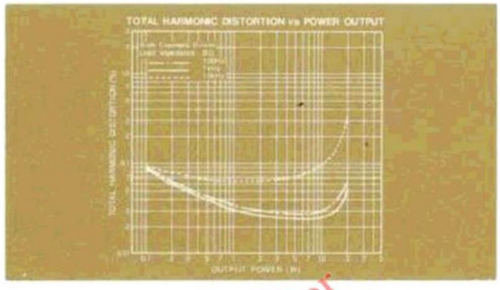
The Power Amplifier Section

Pure Complementary OCL Design, Differential Amplification, Direct Coupling of All Stages

The power which drives your speakers is clean power—power free from distortion or other disabilities. The power amplifier stage *amplifies*—it does not diddle, fiddle or otherwise play around with the signal. This was achieved by lean, sleek circuit construction: no coupling capacitors (except at the input), but instead a pure complementary circuit with differential amplification that handles frequencies almost down to 0 Hz and way above the limit of human hearing with ease and equanimity.

Differential Amplification with Selected Transistors

Strictly selected pairs of transistors provide differential amplification in the initial power amp stage. Regulated power supply through Zener diodes also contributes toward extremely stable operation.



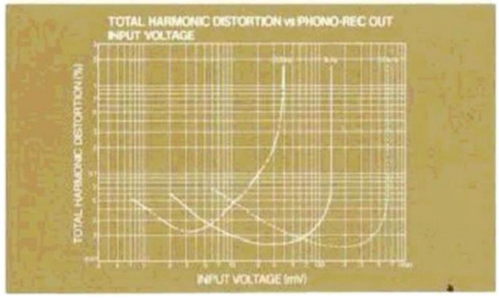
Suppression of On-Off Click Noise

Another advantage of the Zener diodes used extensively in the circuitry: they suppress switching noises that might occur when the unit is turned on or off.

The Pre-Amplifier Section

Phono Equalizer with Extremely Broad Dynamic Margin

As in our most expensive studio equipment, the phono equalizer circuit is energized by a balanced positive-and-negative power supply. It employs PNP transistors of low noise and high voltage handling ability in its first stage and NPN transistors of equal quality in its second stage. This



elaborate construction gives an extremely wide dynamic margin—the SU-3150 can handle phono signals from any cartridge tracking even records cut at very high levels without distortion, while at the same time providing sensitivity to accommodate low-output cartridges with still excellent S/N ratio. Its characteristics are not affected by changes in ambient temperature. In simpler terms, this all means that with a good phono cartridge you hear exactly what's on your records in exactly the way it was recorded.

NFB Tone Controls Incorporated in Power Amp

The tone controls permit precise adjustment of the response curve in 1 dB increments. Negative feedback technology is employed for positive control, but with a unique difference; rather than providing a separate tone control network in the pre-amplifier, Technics engineers built the feedback loop into the power amp, which helps avoid distortions usually associated with tone control circuits.

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Two tape machines (cassette, open reel or cartridge) can be connected for recording (on both at the same time, if you wish), for playback or for tape-to-tape duplicating. For example, you can copy from open reel tapes onto cassettes, or vice versa. An important feature for serious audio enthusiasts.

Connections for Four Speakers, Two Turntables

Two pairs of phono inputs permit two turntables (or one turntable with two tonearms) to be used for comparative A-B listening tests. The SU-3150 can drive two pairs of speakers (in two rooms, if you wish) separately or at the same time.

High and Low Filters

These filters eliminate or, at least, reduce annoying hiss and scratch noises as well as hum that afflict some records and tapes.

All the Technical Refinements of Today's Professional Audio Equipment are Yours in This Pair of Technics Units, for an Investment Well Within the Home Listener's Budget.

Under all but the most extreme conditions, no or hardly any difference in sound quality will be discernible between these units and our (or anybody else's) costliest, professional high fidelity equipment. True, the SU-3150 amplifier delivers less power than would be needed to fill an auditorium—but do you live in an auditorium? And the ample power that it does provide is clean power. Technics-clean.

True, the SU-3150 FM/AM stereo tuner has one or two controls less than our top-of-the-line model, but in every essential function it operates with the same stability and excellence. And what could be more essential than the quality of reception and the quality of the sound you hear?

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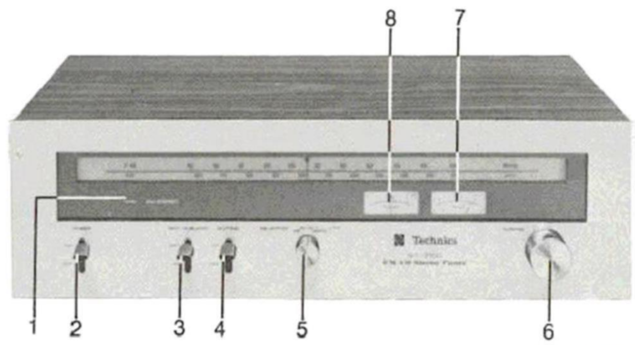
ST-3150

FM/AM Stereo Tuner



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2. Power on/off switch
3. MPX hi-blend switch
4. Muting switch
5. Selector switch
6. Tuning control
7. Signal strength meter
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As a tuner combines aspects of high frequency communications equipment with segments of (relatively) low frequency audio engineering, catalog descriptions of tuners by necessity use a rather particular "jargon" not encountered with amplifiers or turntables: front end, 4-pole MOS FET, IF bandwidth, pilot signal, and so forth. Although quite meaningful to the engineer, these and other terms often mean little to the hi-fi music lover. Before you proceed to the following paragraphs that describe the ST-3150 circuitry in some detail, you may want to have your Dictionary of Audio Terminology ready; easier yet, you can take our word for it that the ST-3150 represents state-of-the-art FM circuit engineering, offers a degree of performance that would have been thought impossible only a few years ago, and gives you the very finest in high fidelity and listening pleasure.

4-Pole MOS FET Gives FM Front End High Sensitivity and Stability

A wide-band, low-loss balun is provided in the antenna matching circuit. The RF amplifier employs a dual-gate 4-pole MOS FET of excellent parameters such as noise, internal feedback, and mutual conductance; this MOS FET provides high operational stability and low noise, while sensitivity is excellent at 1.8μV (IHF). For better stability, the local oscillator is equipped with aluminum-core oscillator coils.

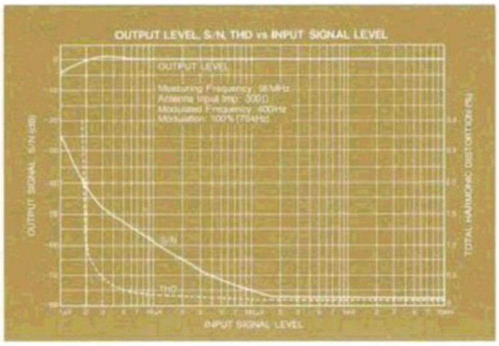
Flat Group Delay Filters in IF Stage

Three 2-element ceramic filters in the IF stage assure high selectivity. What's more, these filters are not the common ceramic "flat amplitude" types but Technics' exclusive "Flat Group Delay" filters. As these filters cause no differences in time delay between the different components of a "cluster" or "group" of signals, they help to reduce distortions to an absolute minimum.

The IF stage is quite elaborate in all parts—independent ICs of high integration density for FM and AM IF amplification, three differential limiter stages with LC filters, for a total of six IF stages. The results are evident in the ultra-low distortion, high selectivity of 70 dB, and practically non-existent residual noise. The FM demodulator uses a ratio detector of excellent quality and a discriminator transformer of good linearity over a wide bandwidth.

PLL Circuit for Sharp, Stable FM Stereo Separation

PLL (phase locked loop) techniques provide the clearest, stablest separation of FM stereo channels among all techniques known today, and are not influenced by temperature, humidity or the passage of time. The MPX decoder works on the double differential time switching principle, with main and subsidiary switching circuits. This elaborate circuitry is combined in an IC of high integration density to assure the greatest possible stability.



Low Pass Filter Does Not Affect Desirable Signal Bandwidth

While eliminating undesirable 19 kHz pilot and 38 kHz sub-carrier components radically, the low pass filter in no way affects the desired signal portion, having flat (+0.2, −1 dB) pass characteristics from 20 Hz to 15 kHz. An elaborate "Tchebycheff" design, this filter contributes greatly to the superb sound quality.

Regulated Power Supply to All Stages

The power supply voltage to all circuits is regulated, meaning that it remains stable even though AC house current may fluctuate as much as ±20%.

Direct-Coupled AF Amplifier

The audio frequency signal is amplified in a circuit of 2-stage direct-coupled design using matched PNP-NPN transistors, for minimum distortion and noise and maximum dynamic range.

Numerous Auxiliary Features Include...

* an MPX hi-blend switch that reduces hiss on weak FM stereo programs (at a small loss in channel separation),
* signal-strength and center tuning meters as well as a linear dial scale for easy, accurate tuning,
* switchable FM muting to eliminate noise between stations,
* a multipath detector output where an oscilloscope can be connected to observe FM multipath conditions,
* an FM 4-channel MPX output which will accommodate a 4-channel demodulator when FM 4-channel broadcasting begins,
* and a carefully engineered AM section, also with linear dial scale, that extracts every bit of sound quality on the AM band.

ST-3150 Technical Specifications

IHF

FM TUNER SECTION

Frequency range	88～108 MHz
Antenna terminals	300Ω (balanced)
	75Ω (unbalanced)
Sensitivity	1.8μV
Total harmonic distortion (400 Hz, 100% modulation)	
MONO	0.2%
STEREO	0.4%
S/N	75 dB
Frequency response	
20 Hz～15 kHz,	+0.2 dB, −1.0 dB
Alternate channel selectivity	70 dB
Capture ratio	1.0 dB
Image rejection at 98 MHz	55 dB
IF rejection at 98 MHz	80 dB
Spurious response rejection at 98 MHz	85 dB
AM suppression	50 dB
Stereo separation	45 dB at 1 kHz, 35 dB at 10 kHz
Leak carrier (19 kHz, 38 kHz)	60 dB

AM TUNER SECTION

Frequency range	520～1610 kHz
Sensitivity	20μV
Selectivity	25 dB
Image rejection at 1000 kHz	45 dB
IF rejection at 1000 kHz	40 dB

GENERAL

Output voltage	0.7V
Power supply	110V/120V/220V/240V
Power consumption	9W
Dimensions (W×H×D)	386×115×313mm ($15\frac{3}{16}$"×$4\frac{17}{32}$"×$12\frac{5}{16}$")
Weight	4.9 kg (10.8 lbs.)

DIN 45 500

FM TUNER SECTION

Frequency range	88～108 MHz
Antenna terminals	300Ω (balanced)
	75Ω (unbalanced)
Sensitivity at ±40 kHz deviation	
	2.0μV, S/N 30 dB, 300Ω
	1.5μV, S/N 20 dB, 300Ω
	1.1μV, S/N 30 dB, 75Ω
	0.8μV, S/N 20 dB, 75Ω
Total harmonic distortion (400 Hz, 100% modulation)	
MONO	0.2%
STEREO	0.4%
S/N at ±40 kHz deviation	
MONO	68 dB
STEREO	60 dB
Frequency response	
20 Hz～15 kHz,	+0.2 dB, −1.0 dB
Alternate channel selectivity	70 dB
Capture ratio	1.0 dB
Image rejection at 98 MHz	55 dB
IF rejection at 98 MHz	80 dB
Spurious response rejection at 98 MHz	85 dB
AM suppression	50 dB
Stereo separation	45 dB at 1 kHz, 35 dB at 10 kHz
Leak carrier (19 kHz, 38 kHz)	60 dB
Limiting point	1.2μV
Bandwidth	
IF amplifier	220 kHz
FM demodulator	820 kHz

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SU-3150 Technical Specifications

IHF

MAIN AMPLIFIER SECTION

Music power	80W (4Ω)
	60W (8Ω)
1 kHz continuous power	
each channel driven	28W/28W (4Ω)
	23W/23W (8Ω)
both channels driven	22W+22W (4Ω)
	20W+20W (8Ω)
20 Hz～20 kHz continuous power	
both channels driven	19W+19W (4Ω)
	17W+17W (8Ω)
Total harmonic distortion	0.5%
Intermodulation distortion	0.5%
Power bandwidth (both channels driven at 8Ω)	
10 Hz～40 kHz,	−3 dB
Residual hum and noise	0.5mV
Damping factor	30 (8Ω)
Load impedance	
MAIN or REMOTE	4～16Ω
MAIN+REMOTE	8～16Ω

PRE-AMPLIFIER SECTION

Input sensitivity and impedance	
PHONO 1, 2	2mV/50kΩ
TUNER	180mV/40kΩ
AUX	180mV/40kΩ
TAPE DECK 1, 2 PLAYBACK	180mV/40kΩ
TAPE DECK 1 REC/PLAY input	180mV/40kΩ
PHONO 1, 2 maximum input voltage	120mV
Total harmonic distortion	0.3%
Signal/noise	
PHONO 1, 2	74 dB
TUNER, AUX	82 dB
Frequency response	
PHONO 1, 2	RIAA standard curve ±0.5 dB
TUNER, AUX	7 Hz～90 kHz, +0 dB −3 dB
Tone controls	
BASS	50 Hz, +11 dB～−11 dB
TREBLE	10 kHz, +10 dB～−10 dB
Filters	
LOW	40 Hz, −6 dB/oct.
HIGH	8 kHz, −6 dB/oct.
Loudness control (volume at −30 dB)	100 Hz, +7 dB
Output voltage and impedance	
PRE OUT	1.2V/5kΩ
TAPE DECK 1, 2 REC OUT	180mV/1kΩ
TAPE DECK 1 REC/PLAY output	30mV/80kΩ

GENERAL

Power supply	110V/120V/220V/240V
Power consumption	190W
Dimensions (W×H×D)	386×115×303mm ($15\frac{3}{16}$"×$4\frac{17}{32}$"×$11\frac{15}{16}$")
Weight	6.1 kg (13.5 lbs.)

DIN 45 500

AMPLIFIER SECTION

Music power	2×40W (4Ω)
	2×30W (8Ω)
1 kHz continuous power	
both channels driven	2×22W (4Ω)
	2×20W (8Ω)
20 Hz～20 kHz continuous power	
both channels driven	2×19W (4Ω)
	2×17W (8Ω)
Total harmonic distortion	
rated power at 1 kHz, 4Ω	0.5%
rated power at 40 Hz～16 kHz, 4Ω	0.5%
Intermodulation distortion	
rated power at 250 Hz : 8,000 Hz =4:1, 4Ω	0.5%
Power bandwidth (both channels driven at 4Ω)	
10 Hz～30 kHz,	−3 dB
Frequency response	
8 Hz～80 kHz,	+0 dB −3 dB
Signal/noise	
rated power PHONO	59 dB
AUX	75 dB
50mW power output PHONO	55 dB
AUX	58 dB
Damping factor	30 (8Ω)
Load impedance	
MAIN or REMOTE	4～16Ω
MAIN+REMOTE	8～16Ω
Input sensitivity and impedance	
PHONO 1, 2	2mV/50kΩ
TUNER	180mV/40kΩ
AUX	180mV/40kΩ
TAPE DECK 1, 2 PLAYBACK	180mV/40kΩ
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National **Technics**
Matsushita Electric

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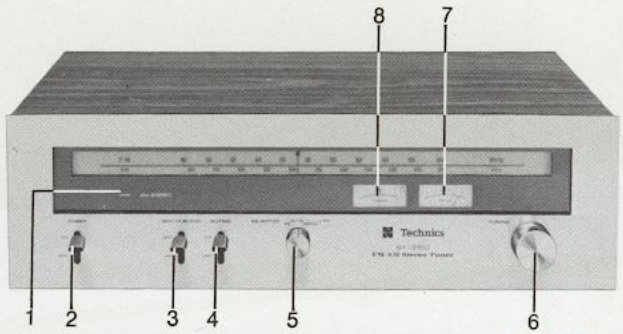

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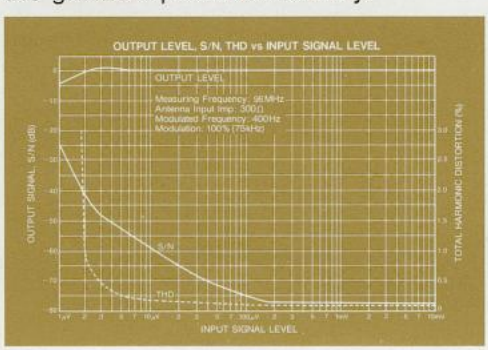

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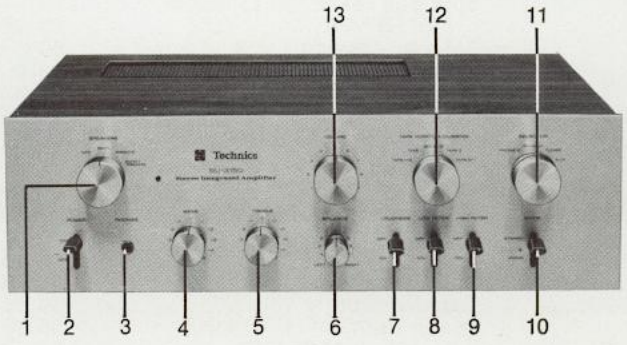

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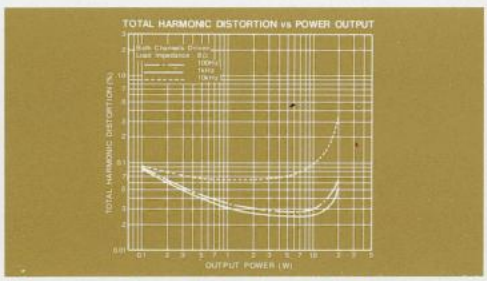

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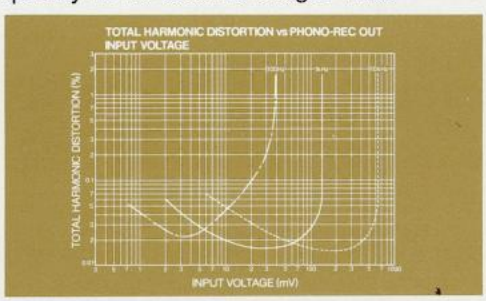

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IHF

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Sensitivity	1.8μV
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STEREO	0.4%
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IF rejection at 1000 kHz	40 dB

GENERAL

Output voltage	0.7V
Power supply	110V/120V/220V/240V
Power consumption	9W
Dimensions (W×H×D)	386×115×313mm ($15\frac{3}{16}$"×$4\frac{17}{32}$"×$12\frac{5}{16}$")
Weight	4.9 kg (10.8 lbs.)

DIN 45 500

FM TUNER SECTION

Frequency range	88～108 MHz
Antenna terminals	300Ω (balanced)
	75Ω (unbalanced)
Sensitivity at ±40 kHz deviation	
	2.0μV, S/N 30 dB, 300Ω
	1.5μV, S/N 20 dB, 300Ω
	1.1μV, S/N 30 dB, 75Ω
	0.8μV, S/N 20 dB, 75Ω
Total harmonic distortion (400 Hz, 100% modulation)	
MONO	0.2%
STEREO	0.4%
S/N at ±40 kHz deviation	
MONO	68 dB
STEREO	60 dB
Frequency response	
20 Hz～15 kHz, +0.2 dB, −1.0 dB	
Alternate channel selectivity	70 dB
Capture ratio	1.0 dB
Image rejection at 98 MHz	55 dB
IF rejection at 98 MHz	80 dB
Spurious response rejection at 98 MHz	85 dB
AM suppression	50 dB
Stereo separation	45 dB at 1 kHz, 35 dB at 10 kHz
Leak carrier (19 kHz, 38 kHz)	60 dB
Limiting point	1.2μV
Bandwidth	
IF amplifier	220 kHz
FM demodulator	820 kHz

AM TUNER SECTION

Frequency range	520～1610 kHz
Sensitivity	20μV
Selectivity	25 dB
Image rejection at 1000 kHz	45 dB
IF rejection at 1000 kHz	40 dB

GENERAL

Output voltage	0.7V
Power supply	110V/120V/220V/240V
Power consumption	9W
Dimensions (W×H×D)	386×115×313mm ($15\frac{3}{16}$"×$4\frac{17}{32}$"×$12\frac{5}{16}$")
Weight	4.9 kg (10.8 lbs.)

SU-3150 Technical Specifications

IHF

MAIN AMPLIFIER SECTION

Music power	80W (4Ω)
	60W (8Ω)
1 kHz continuous power	
each channel driven	28W/28W (4Ω)
	23W/23W (8Ω)
both channels driven	22W+22W (4Ω)
	20W+20W (8Ω)
20 Hz～20 kHz continuous power	
both channels driven	19W+19W (4Ω)
	17W+17W (8Ω)
Total harmonic distortion	0.5%
Intermodulation distortion	0.5%
Power bandwidth (both channels driven at 8Ω)	
10 Hz～40 kHz, −3 dB	
Residual hum and noise	0.5mV
Damping factor	30 (8Ω)
Load impedance	
MAIN or REMOTE	4～16Ω
MAIN+REMOTE	8～16Ω

PRE-AMPLIFIER SECTION

Input sensitivity and impedance	
PHONO 1, 2	2mV/50kΩ
TUNER	180mV/40kΩ
AUX	180mV/40kΩ
TAPE DECK 1, 2 PLAYBACK	180mV/40kΩ
TAPE DECK 1 REC/PLAY input	180mV/40kΩ
PHONO 1, 2 maximum input voltage	120mV
Total harmonic distortion	0.3%
Signal/noise	
PHONO 1, 2	74 dB
TUNER, AUX	82 dB
Frequency response	
PHONO 1, 2	RIAA standard curve ±0.5 dB
TUNER, AUX	7 Hz～90 kHz, +0 dB, −3 dB
Tone controls	
BASS	50 Hz, +11 dB～−11 dB
TREBLE	10 kHz, +10 dB～−10 dB
Filters	
LOW	40 Hz, −6 dB/oct.
HIGH	8 kHz, −6 dB/oct.
Loudness control (volume at −30 dB)	100 Hz, +7 dB
Output voltage and impedance	
PRE OUT	1.2V/5kΩ
TAPE DECK 1, 2 REC OUT	180mV/1kΩ
TAPE DECK 1 REC/PLAY output	30mV/80kΩ

GENERAL

Power supply	110V/120V/220V/240V
Power consumption	190W
Dimensions (W×H×D)	386×115×303mm ($15\frac{3}{16}$"×$4\frac{17}{32}$"×$11\frac{15}{16}$")
Weight	6.1 kg (13.5 lbs.)

DIN 45 500

AMPLIFIER SECTION

Music power	2×40W (4Ω)
	2×30W (8Ω)
1 kHz continuous power	
both channels driven	2×22W (4Ω)
	2×20W (8Ω)
20 Hz～20 kHz continuous power	
both channels driven	2×19W (4Ω)
	2×17W (8Ω)
Total harmonic distortion	
rated power at 1 kHz, 4Ω	0.5%
rated power at 40 Hz～16 kHz, 4Ω	0.5%
Intermodulation distortion	
rated power at 250 Hz : 8,000 Hz =4:1, 4Ω	0.5%
Power bandwidth (both channels driven at 4Ω)	
10 Hz～30 kHz, −3 dB	
Frequency response	
8 Hz～80 kHz, +0 dB, −3 dB	
Signal/noise	
rated power PHONO	59 dB
AUX	75 dB
50mW power output PHONO	55 dB
AUX	58 dB
Damping factor	30 (8Ω)
Load impedance	
MAIN or REMOTE	4～16Ω
MAIN+REMOTE	8～16Ω
Input sensitivity and impedance	
PHONO 1, 2	2mV/50kΩ
TUNER	180mV/40kΩ
AUX	180mV/40kΩ
TAPE DECK 1, 2 PLAYBACK	180mV/40kΩ
TAPE DECK 1 REC/PLAY input	180mV/40kΩ
PHONO 1, 2 maximum input voltage	120mV
Tone controls	
BASS	50 Hz, +11 dB～−11 dB
TREBLE	10 kHz, +10 dB～−10 dB
Filters	
LOW	40 Hz, −6 dB/oct.
HIGH	8 kHz, −6 dB/oct.
Loudness control (volume at −30 dB)	100 Hz, +7 dB
Output voltage and impedance	
PRE OUT	1.2V/5kΩ
TAPE DECK 1, 2 REC OUT	180mV/1kΩ
TAPE DECK 1 REC/PLAY output	30mV/80kΩ

GENERAL

Power supply	110V/120V/220V/240V
Power consumption	190W
Dimensions (W×H×D)	386×115×303mm ($15\frac{3}{16}$"×$4\frac{17}{32}$"×$11\frac{15}{16}$")
Weight	6.1 kg (13.5 lbs.)

National **Technics**
Matsushita Electric