YAMAHA R-2000

Natural Sound AM/FM Stereo Receiver

Yamaha "X" Power Amplifier System

150 Watts (8 ohms) RMS per Channel, 0.015% Distortion

Unique Yamaha Spatial Expander

Exclusive Natural-Response Tone Controls

Built-In High-Performance MC Cartridge Head Amplifier

Convenient Auto-Phono Function

Yamaha Station Locked Synthesizer Tuning System

7 FM/7 AM Preset Tuning, Ultra-Linear Direct FM Detector

Behind the Superior Yamaha Sound

Yamaha's foundation as a manufacturer spans more than a hundred years in a number of specialized fields.

Since the company began as a producer of reed organs, it has expanded steadily until today, Yamaha music instruments, sound reinforcement gear, music education and popularization programs, sports equipment, and of course, audio products, are renowned worldwide for their highly refined performance.

Naturally, the many years spent in intensive research and development in all these fields has resulted in a vast and varied store of technology.

Moreover, the finely balanced interrelationship between the many Yamaha in-house technologies, production facilities and product groups creates a highly efficient network that makes it possible to achieve optimum quality and performance in every product.

Yamaha audio know-how, however, does not stop at technology.

Each and every new audio product must face the most demanding challenge imaginable: the critical ears of Yamaha music instrument designers.

Unless the reproduced sound is exactly like the real thing, the product is not considered finished.

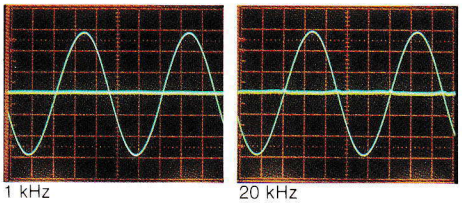
Yamaha gives you vast technology tamed by musical sensitivity — a claim no other audio manufacturer can honestly make.

RECEIVER PERFORMANCE THAT GOES BEYOND

ALL NEW TECHNOLOGY FOR SUPERIOR SOUND AND CONTROL CONVENIENCE

For the audio fan who demands the very finest reproduction performance and appreciates the easy-handling of an integrated receiver-type format, the Yamaha R-2000 is a most appropriate choice. It incorporates a wealth of new, sound-oriented Yamaha technology and convenience features that guarantee the highest reproduction quality with all music sources.

Output Distortion Waveform
Aux to Sp Out, Half Rated Power, 8 ohms

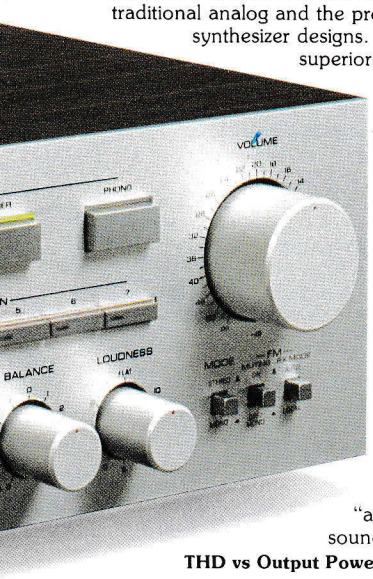


1 kHz 20 kHz

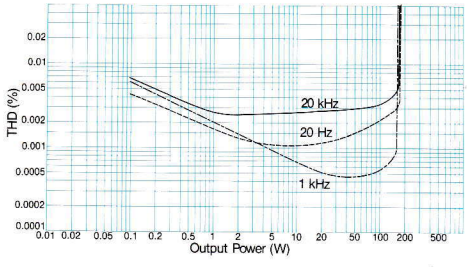
The power amplifier section, for example, features Yamaha's very special "X" Power system, delivering super-clean output all the way up to full 150 watts per channel power. There's also a new Spatial Expander feature that lets you more accurately recreate the sound field and ambience of the original live performance.

The tuner section is a bold departure from both traditional analog and the presently popular digital synthesizer designs. While it offers the superior tuning convenience of synthesizer types, advanced Yamaha circuitry eliminates the sound quality degradation caused by conventional digital synthesizer circuitry.

With its incredible music reproduction accuracy, uncompromising quality, and extensive operational flexibility, the R-2000 is the ideal receiver around which to build an "audiophile-class" sound system.

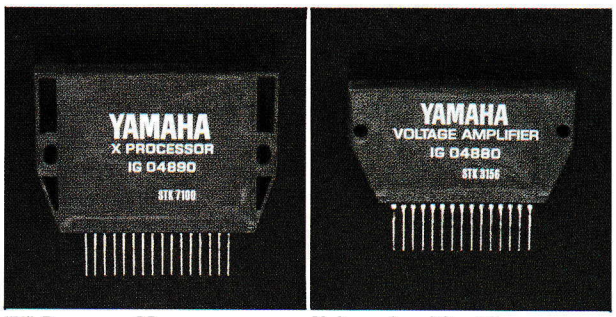


THD vs Output Power



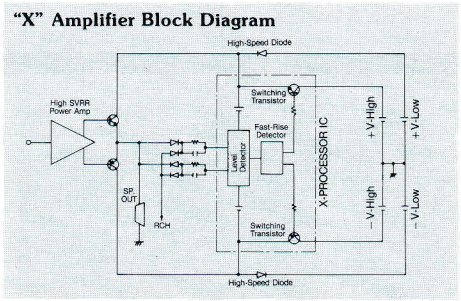
"X" POWER AMPLIFIER

A large portion of the performance loss and inefficiency in conventional power amplifiers is due to the fact that the power output transistors are required to handle the full power supply potential even when the amplifier is operating under small signal level—or even no signal—conditions. This excess power must be dissipated by the usual large, finned heat sinks in order to prevent breakdown of the power transistors and unstable operation of other components that are influenced by temperature variations. The "X" Power Amplifier overcomes this problem through a power level switching system that ensures the most stable, accurate power amplification performance.



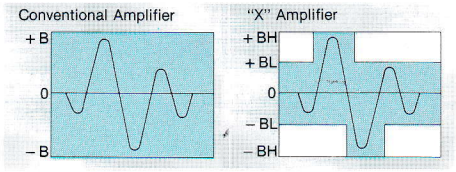
"X" Processor IC Voltage Amplifier IC

"X" Amplifier Block Diagram



The "X" Power Amplifier Principle

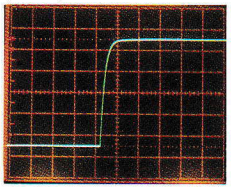
Supply power is delivered to the "X" Power Amplifier in two levels: BH (High Voltage) and BL (Low Voltage). Special high-speed comparator circuitry monitors the level envelope of the audio signal and switches on the high-voltage supply only when required to handle high-level music peaks—actually only a very small percentage of total music time. Additional fast-rise detectors are incorporated to detect exceptionally fast-rising music transients and turn on the high voltage supply a little ahead of time so switching distortion cannot occur. A delay is also incorporated in the switch-down phase (BH to BL) to completely eliminate the possibility of switching distortion. This system is so precise that even a single 100 kHz cycle at full 150 watt output power cannot cause distortion.



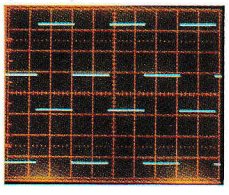
Superior Sound Efficiency and Accuracy

The results of the "X" Power Amplifier system are enormously beneficial to the music lover who demands the cleanest, most natural reproduction. The R-2000 offers high quality, high power amplification, vastly improved power efficiency, highly stable operation, improved dynamic range and low distortion (0.005% THD, 20—20,000 Hz, 150 W/ch., 8 ohms). But the real benefit to the music lover is that the "X" Power Amplifier offers superb sound reproduction quality that will be well up to date with even the most advanced source production technology—including direct-cut and PCM recording—for many years to come.

Power Amplifier Transient Response (5 kHz)



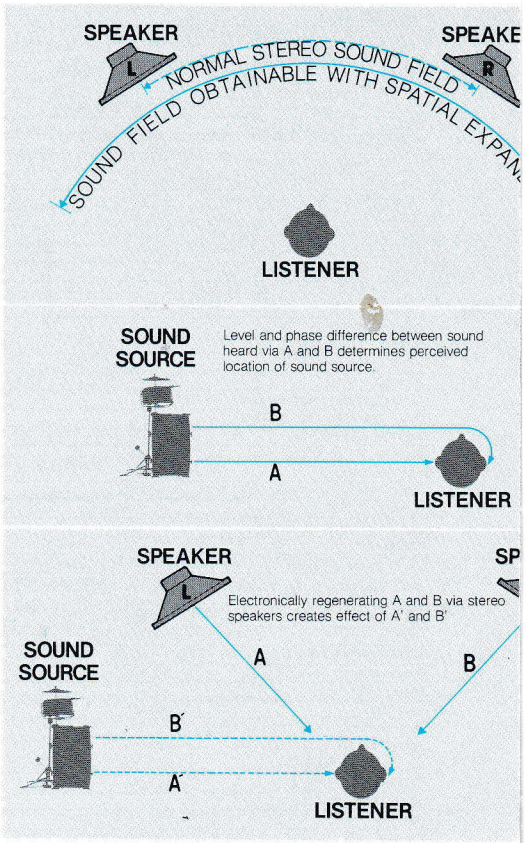
Power Amplifier Square Wave Response (15 kHz)



SOPHISTICATED PREAMPLIFIER FEATURES

Super-Stereo Spatial Expander

Advanced Yamaha technology overcomes the last barrier to true high fidelity reproduction. The Spatial Expander puts the "ambience" back in the reproduced sound—the one element that conventional stereo cannot provide.

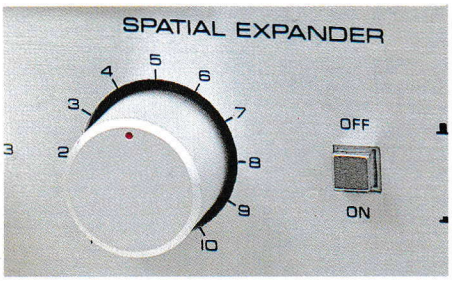


With normal stereo reproduction, the apparent locations of the various music instruments are limited to the space between the left and right stereo speakers. Many so-called "ambience enhancement" systems attempt to overcome this by adding an extra pair of speakers—naturally requiring an extra amplifier *plus* the separate ambience unit—thereby considerably increasing system cost and inconvenience. The Yamaha Spatial Expander control, however, offers continuously variable expansion of the stereo sound image, putting a more realistic distance between the musicians and creating an incredibly "live" sound without the need for any extra speakers or amplification.

JUST GREAT RECEPTION

R-2000

Natural Sound AM/FM Stereo Receiver



The Spatial Expander Principle

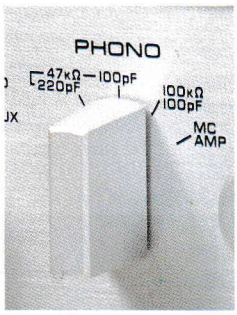
The human ears and brain, by comparing the level and phase difference between the sound heard by both ears, can determine which direction the sound is coming from with reasonable accuracy. Ordinary stereo takes advantage of this to create apparent sound sources at various points between the two speakers (not just *at* the speakers). Yamaha engineers and music specialists researched the stereo effect thoroughly to develop a system that would improve it—without having to add extra speakers. Their work proved that by electronically regenerating the conditions required for a listener to perceive a sound source beyond the normal stereo field, an apparent sound source was actually created in the desired location. This knowledge, applied in the Yamaha Spatial Expander, gives you the capability to greatly expand your sound, and your listening enjoyment.

Built-In High-Performance MC Head Amp

Today's moving coil (MC) phono cartridges offer sound reproduction quality with greater detail and clarity than most of their moving magnet (MM) counterparts. MC cartridge output level, however, is too low to be fed directly to most phono equalizer amplifiers, requiring an extra stage of amplification in the form of a step-up transformer or MC head amplifier. The R-2000 offers a low-noise, high-performance MC cartridge head amplifier built-in that lets you gain the benefits of superior MC sound performance without the inconvenience and expense of a separate head amp.

Selectable Phono Load Impedance/Capacitance

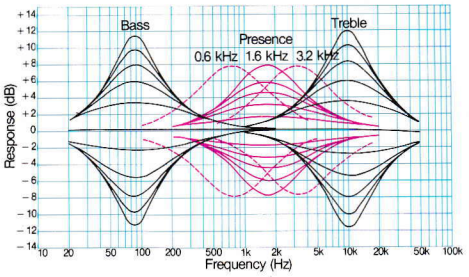
The response of MM phono cartridges changes considerably according to load impedance and capacitance. So you can get the best possible response from your favorite cartridge, the R-2000 offers selectable 47 k-ohm/220 pf, 47 k-ohm/100 pf and 100 k-ohm/100 pf cartridge loads. These values have been carefully selected for optimum compatibility with the majority of available cartridges.



Exclusive Natural Response Tone Controls

The tone controls featured in the R-2000 are unique in that their response has been carefully tailored to produce the most natural overall tonal balance at any setting. For example, when you turn up the treble control the *entire* treble range is boosted so, rather than getting annoyingly hissy cymbals and not enough emphasis on flutes or the piano high range, all the treble-range instruments come through with perfectly natural balance. The same applies to the bass range. Additionally, the presence (midrange) control features selectable center frequencies—800, 1,600 or 3,200 Hz—so you can smoothly emphasize or deemphasize vocals or music instruments in this active music response range.

Tone Control Characteristics



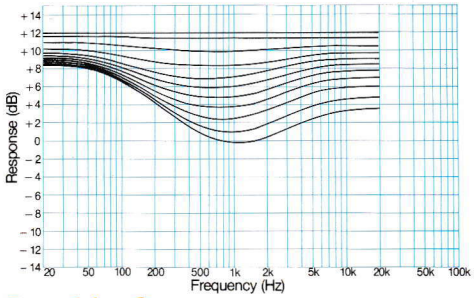
Convenient Auto-Phono Function

This highly unique, useful feature is guaranteed to make your listening life a lot easier. With the Auto-Phono function engaged, you can listen to any source using the input selector buttons—tuner, aux, or tape. But then when you want to listen to a record all you have to do is lower the stylus onto the disc and the phono input is automatically selected. When the record ends, the R-2000 automatically switches back to the source determined by the input selectors. The Auto-Phono function can be turned off when not needed.

Continuously Variable Loudness Control

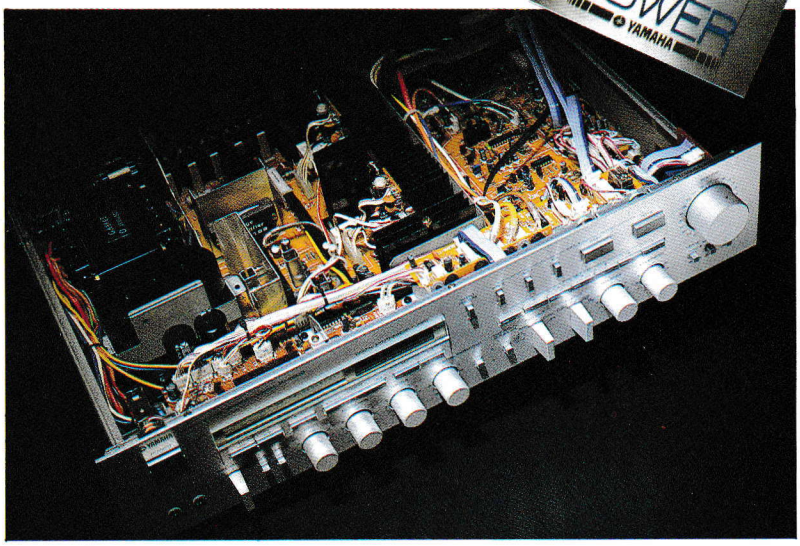
This original Yamaha control feature makes an incredible difference in low-level music listening. The human ear gradually loses its sensitivity to bass and treble frequencies as volume is reduced. That's why music tends to sound dull and lifeless when you're listening at low volume. The loudness switches provided on most amplifiers are intended to compensate for this loss by boosting the low and high frequency ranges. However, since these switches only provide one fixed degree of compensation, the response you hear is only accurate at the single corresponding volume level. In addition to providing continuously variable loudness compensation so you get precise subjective tonal response at *any* listening level, the Yamaha control works by suppressing the midrange rather than by boosting the highs and lows meaning that it does not add any noise or distortion as do conventional loudness switches. The result is full tonal impact plus pure, accurate music reproduction at any volume level.

Continuous Loudness Characteristics

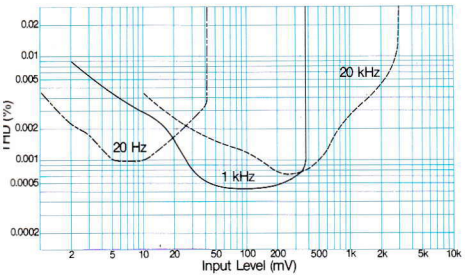


Record Any Source While Listening to Any Other

The Yamaha Rec Out selector lets you literally do two things at once. For example, if you have some records you want to transfer to tape, and there just happens to be a great FM program on you want to hear, the Rec Out selector lets you do both simultaneously. On the other hand, if someone wants to listen to a record while the radio show you want to hear is on, you can play the record while taping the radio show for later listening. This works for any combination of sources—tuner, phono, aux, tape—so your listening interests will never have to compete with your recording needs.



Phono Harmonic Distortion vs Input Level

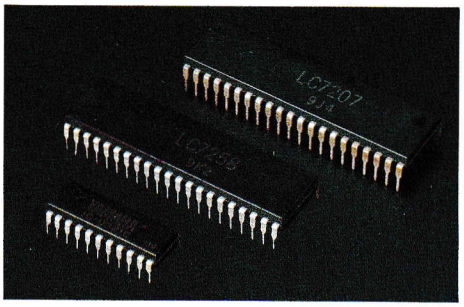


SOUND-ORIENTED TUNER DESIGN

Station Locked Synthesizer Tuning System

Quartz PLL synthesizer tuners actually have built-in noise, distortion and interference. Their internal quartz oscillator and frequency dividers, although accurate, are generating radio frequency signals within the tuner itself so some interference due to leakage of these signals is virtually unavoidable. The R-2000 tuner section, on the other hand, uses Yamaha's unique Station Locked tuning system which, in addition to being extremely accurate because it locks the tuner's frequency directly onto that of the broadcast station, produces no interference-causing RF noise. You get pinpoint tuning accuracy plus pure, distortion-free reception—precisely what a first-class tuner should provide.

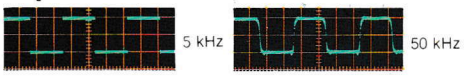
Station Locked Tuning System ICs



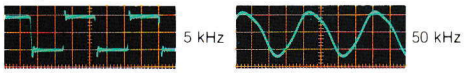
Ultra-Linear Direct FM Detector

Another impressive Yamaha technological feature incorporated in the R-2000 tuner section is the ultra-linear direct FM detector circuit. It features greatly improved linearity even when compared to the recent pulse-count detector designs, and a greatly simplified signal path ensures that no noise or distortion is added to the music signal. This is just one of the innovations incorporated in the R-2000 tuner section that help to raise FM reception to the level where it can justifiably be called "high fidelity."

Ultra-Linear Direct FM Detector Square-Wave Response



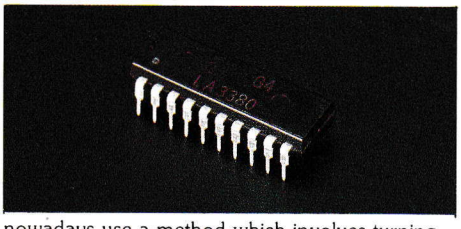
Frequency Counter FM Detector Square-Wave Response



DC NFB PLL Multiplex Demodulator

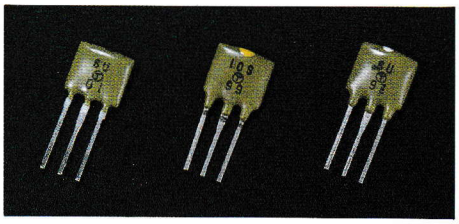
The purpose of the multiplex demodulator is to separate the left and right channels of the composite stereo signal. Most high performance tuners

DC NFB PLL Multiplex Demodulator IC



nowadays use a method which involves turning the composite signal on and off at a 38 kHz rate. Because the switches used are in the signal path, however, switching distortion can be a problem. The multiplex demodulator of the R-2000 solves this by incorporating the switches into the NFB (negative feedback) loop of a high-slew-rate DC amp, thereby eliminating switching distortion. And a PLL (phase-locked loop) circuit effectively blocks interference. Overall the circuit features excellent stereo separation, low harmonic and intermodulation distortion, and superior transient response for the most natural FM stereo reproduction.

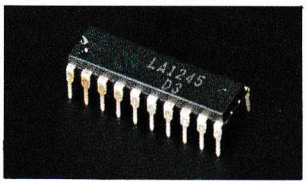
Ceramic Filters



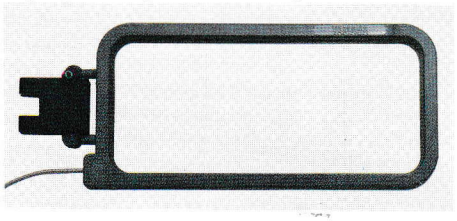
Superior AM Performance

The R-2000 is designed for optimum sound quality right down to the often-overlooked AM section. The IF amplifier stage incorporates a high-performance integrated circuit normally used in the IF amp of top-quality FM tuners. A high-Q antenna coil and a specially designed low-impedance loop antenna bring you AM reception at its best. AM sensitivity is an extra-high 200 μV/m, and the 0.3% distortion figure is your assurance of extraordinarily clean AM sound.

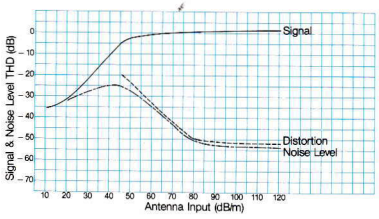
High Performance AM IC



High-Q Low-Impedance AM Loop Antenna



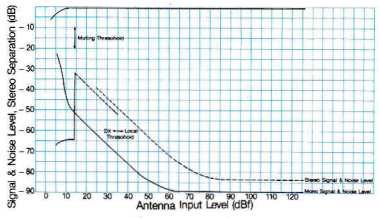
AM Antenna Input vs Signal and Noise Level, THD



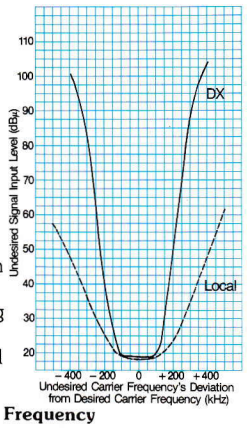
Tracking Type Pure Pilot Canceller

Once the 19 kHz pilot signal has done its job, it must be removed from the signal path to prevent interference with the audio signal. In conventional tuners this is accomplished by filtration circuitry that also limits the high frequency audio range. Yamaha has solved this problem by employing a tracking type canceller that entirely eliminates the pilot signal by summing it with a signal of identical frequency and amplitude, but 180° out of phase. This system has no effect on the audio range below 19 kHz thereby ensuring extended frequency response and improved sound quality.

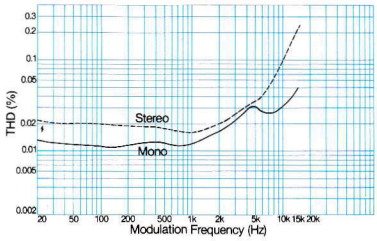
FM Antenna Input vs. Output Level, Noise Level, Stereo Separation



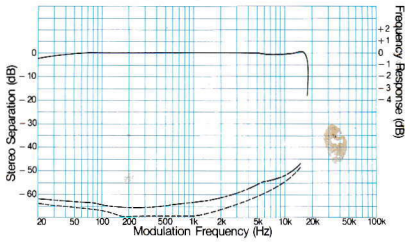
Undesired Signal Input Level (dBμ)



FM THD vs Modulation Frequency



FM Frequency Response/Stereo Separation vs Modulation Frequency



SOPHISTICATED TUNING CONVENIENCE

Pushbutton Search Tuning

The R-2000 has no tuning dial or tuning knob. In place of the tuning dial it has a bright digital frequency display that tells you precisely what frequency the tuner is receiving. And the tuning knob has been replaced by an Down/Up tuning button. To tune in a station you simply push either the up or down end of the tuning button depending on whether the desired station's broadcast frequency is above or below the frequency currently displayed on the digital frequency readout. The R-2000 then sweeps across the broadcast band in the designated direction until it comes to the next station, where it stops automatically—in perfect tuning. To go on to the next station simply press the button again. This system makes for fast, easy, pinpoint tuning of the desired station.

7 FM/7 AM Preset Tuning

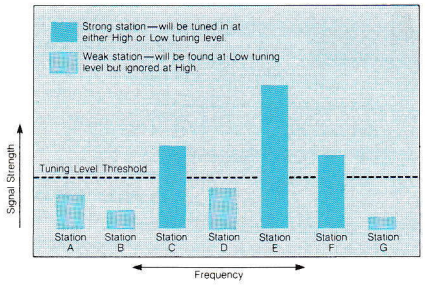
Up to 14 of your favorite stations, 7 FM and 7 AM, can be programmed into the R-2000's memory for instant recall without having to sweep the broadcast band. To program a station, first set the receiver to the appropriate mode—FM or AM—and then tune in the desired station manually. Then all you do is press one of the seven preset buttons while holding the Memory button and the job is done. Any time you press the preset button thus programmed, the desired station will be instantly, precisely tuned in.

R-2000

Natural Sound AM/FM Stereo Receiver

Tuning Level Buttons

These greatly simplify tuning when the band is crowded with stations. In Low Tuning Level mode, pushing the Tuning button will cause the receiver to scan the band and stop at the next station, regardless of the station's strength. In High mode, the receiver will stop only at strong stations capable of quality reception.



PERFECT RECEPTION UNDER ANY SIGNAL CONDITIONS

Automatic DX/Local Switching

The R-2000 automatically ensures the best possible FM reception, regardless of signal conditions. When a weak, noisy station is received, the DX mode is automatically selected. This means higher selectivity for stronger rejection of interference. For stronger stations, the Local mode is selected providing broader selectivity for more accurate, distortion-free music reproduction with increased stereo separation.
The R-2000's Auto-DX feature is a dramatic improvement over the single, compromised selectivity value provided by conventional tuners.

Auto Blend

This circuit reduces high-frequency hiss on weak, noisy stereo stations. Unlike many models whose blend circuits must be manually activated with a switch, the R-2000's Auto Blend comes on automatically when needed.

Signal Quality Meter

This unique dual-function meter shows signal strength and also indicates the presence of multipath interference to aid you in tuning and setting up your antenna for optimum reception.

Other Features

- Pre-Main Coupler switch with Pre Out and Main In terminals offers maximum system flexibility
- Switchable subsonic and high filters help to reduce subsonic interference from warped records and high frequency hiss or scratch noise from tapes and records
- Dual tape deck terminals with convenient tape copy function
- Speaker A, B, A+B or C selector

R-2000 SPECIFICATIONS

AUDIO SECTION	
Minimum RMS Output Power per Channel	
8 ohms, 20 to 20,000 Hz,	
0.015% THD	150 W (21.8 dBW)
8 ohms, 20 to 20,000 Hz,	
0.005% THD, Main In	150 W (21.8 dBW)
4 ohms, 1 kHz, 0.5% THD,	
Clipping Power	150 W
Dynamic Headroom (8 ohms)	3 dB
Total Harmonic Distortion (20 to 20,000 Hz)	
Phono MM to Rec Out (3 V output)	0.005%
Phono MC to Rec Out (3 V output)	0.01%
Aux/Tape to Pre Out (2 V output)	0.005%
Aux/Tape to Sp Out (8 ohms, 1 W)	0.005%
Main In to Sp Out (8 ohms, 1 W)	0.005%
IM Distortion Ratio (Aux/Tape to Sp Out)	
(8 ohms, 75 W)	0.01%
Power Bandwidth	
(8 ohms, 75 W, 0.02% THD)	5 to 40,000 Hz
Damping Factor	
(8 ohms, 1 kHz)	60
Frequency Response	
(Aux/Tape to Sp Out, 8 ohms,	
5 to 50,000 Hz)	−1 dB
(Main In, DC to 100,000 Hz)	−1 dB
RIAA Deviation	
Phono MM (20 to 20,000 Hz)	±0.2 dB
Phono MC (30 to 20,000 Hz)	±0.3 dB
Input Sensitivity/Impedance	
Phono MM	2.5 mV/47 k-ohms,
	100 pF or 220 pF
	2.5 mV/100 k-ohms, 100 pF
Phono MC	100 μV/100 ohms
Aux/Tape	120 mV/47 k-ohms
Main In	1 V/47 k-ohms
Input Sensitivity (New IHF)	
Phono MM	0.2 mV
Phono MC	8.2 μV
Aux/Tape	9.8 mV
Maximum Input Level (0.01% THD)	
Phono MM (20 to 20,000 Hz)	250 mV
(1 kHz)	280 mV
Phono MC (1 kHz)	11 mV
Output Level/Impedance	
Rec Out (Phono)	120 mV/470 ohms
Pre Out	1 V/430 ohms
Headphone Output	780 mW (0.015% THD)
Signal-to-Noise Ratio (IHF A Network)	
Phono MM (5 mV, Input Shorted)	90 dB
Phono MC (500 μV, Input Shorted)	84 dB
Aux/Tape (Input Shorted)	100 dB
Main In (Input Shorted)	120 dB
Signal-to-Noise Ratio (New IHF)	
Phono MM	80 dB
Phono MC	77 dB
Aux/Tape	87 dB
Main In	100 dB
Residual Noise (IHF A Network)	50 μV
Channel Separation (1 kHz, vol −30 dB, 5.1 k-ohms)	
Aux/Tape to Other Channel	−64 dB
Phono MM to Other Channel	−64 dB
Tone Control Characteristics	
Bass (boost/cut)	±11 dB at 80 Hz
Treble (boost/cut)	±12 dB at 10 kHz
Center Frequencies	
Bass	80 Hz
Treble	10 kHz
Presence Control Range	±8 dB (Center Frequency)
Center Frequency	0.8/1.6/3.2 kHz
Filter Characteristics	
Low (Subsonic)	15 Hz, −12 dB/oct
High	8 kHz, −6 dB/oct
Continuous Loudness Control (Level-Related Equalization)	
Max. Attenuation	−20 dB at 1 kHz
Rec. Output Level/Impedance (Fixed)	
FM (100% mod. 1 kHz)	500 mV/1.8 k-ohms
AM (30% mod. 1 kHz)	150 mV/1.8 k-ohms
FM SECTION	
Tuning Range	87.6 to 108 MHz
50 dB Quieting Sensitivity	
Mono (DX)	2.8 μV (14.2 dBf)
Stereo (DX, Auto Blend)	25 μV (33.2 dBf)
Usable Sensitivity (IHF, Mono)	
(1 kHz 100% mod.)	
(300 ohms)	2.0 μV (11.3 dBf)
(75 ohms)	1.0 μV (11.3 dBf)
(1 kHz, 30% mod.)	
300 ohms	1.6 μV (9.3 dBf)
75 ohms	0.8 μV (9.3 dBf)
Image Response Ratio (98 MHz)	70 dB
IF Response Ratio (98 MHz)	100 dB
Spurious Response Ratio (98 MHz)	100 dB
AM Suppression Ratio (IHF)	65 dB
Capture Ratio (IHF)	Local 1.2 dB, DX 2.5 dB
Alternate Channel Selectivity (IHF)	Local 30 dB, DX 82 dB
Selectivity (Two Signals)	DX 68 dB
Signal-to-Noise Ratio	
Mono	85 dB
Stereo	81 dB
Distortion	
Mono 100 Hz	Local 0.06%, DX 0.1%
1 kHz	Local 0.06%, DX 0.3%
6 kHz	Local 0.08%, DX 0.7%
Stereo 100 Hz	Local 0.07%, DX 0.5%
1 kHz	Local 0.07%, DX 0.5%
6 kHz	Local 0.09%, DX 0.8%
IM Distortion (IHF)	
Mono	Local 0.07%, DX 0.5%
Stereo	Local 0.08%, DX 1.0%
Stereo Separation (Local)	
50 Hz	50 dB
1 kHz	50 dB
10 kHz	45 dB
Frequency Response	
50 Hz to 10 kHz	±0.3 dB
30 Hz to 15 kHz	+0.3, −0.5 dB
Subcarrier Product Ratio	65 dB
Muting Threshold (DX)	2.8 μV (14.2 dBf)
Auto-DX Threshold	32 μV (35.3 dBf)
Tuning Level Threshold	56 μV (40.2 dBf)
AM SECTION	
Tuning Range	525 to 1,605 kHz
Usable Sensitivity (Loop Antenna)	200 μV (46 dB μ/m)
Selectivity	30 dB
Signal-to-Noise Ratio	50 dB
Image Response Ratio	40 dB
Spurious Response Ratio	50 dB
Distortion (1 kHz)	0.3%
Tuning Level Threshold	3 mV (70 dB μ/m)
GENERAL	
Power Supply	Matched to supply voltage and frequency of each area
Power Consumption	
U.S.A. and Canada	550 W
Europe, Britain and Australia	920 W
Other Areas	330 W
Dimensions (W x H x D)	540 x 122 x 385.6 mm (21-1/4" x 4-3/4" x 15-1/4")
Weight	
U.S.A. and Canada	13.3 kg (29 lbs. 5 oz.)
Northern Europe	13 kg (28 lbs. 10 oz.)
Britain, Australia and Other Areas	13.1 kg (28 lbs. 14 oz.)

Specifications subject to change without notice.

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