

# YAMAHA

Natural Sound Stereo Pre Amplifiers

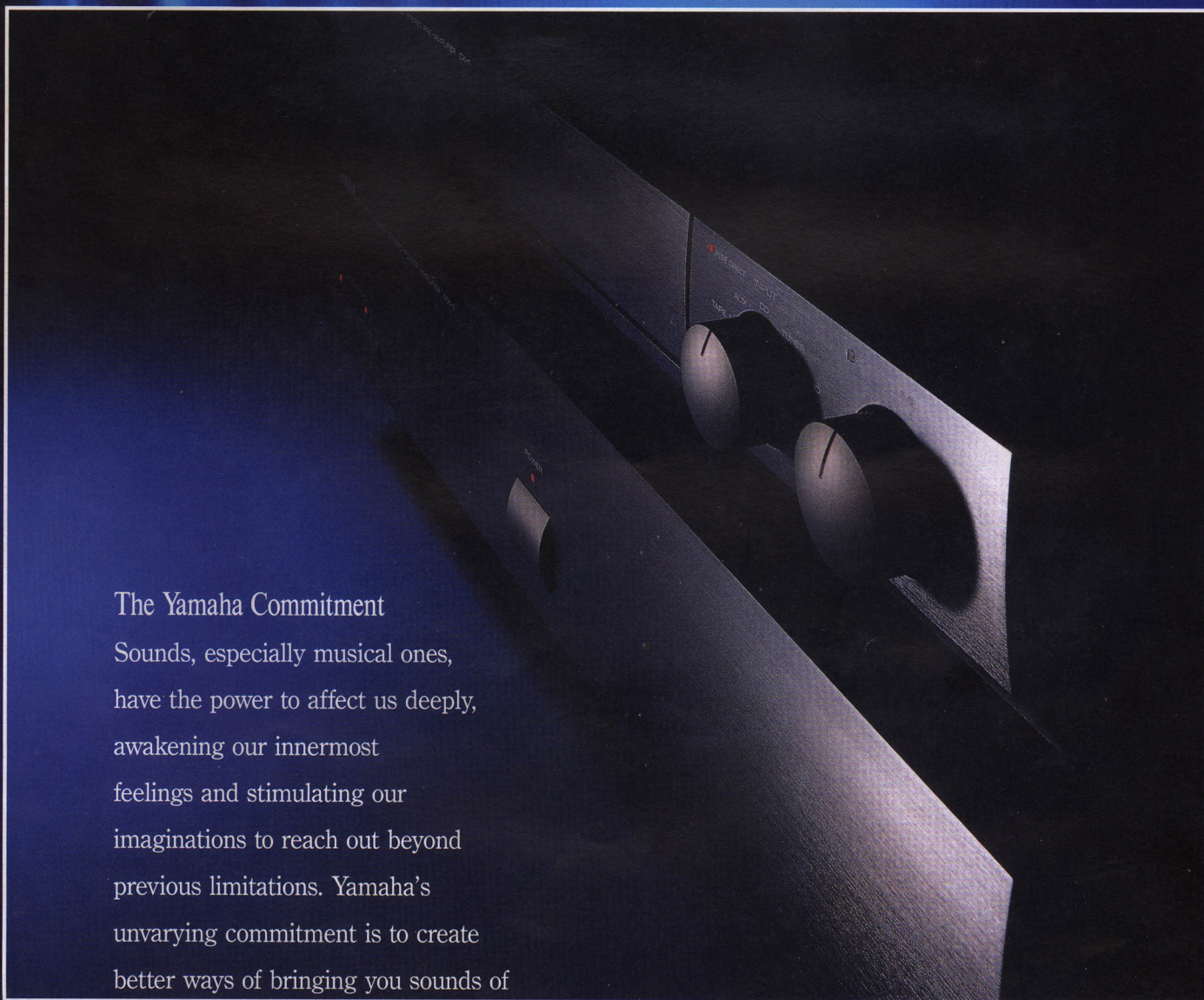
## CX-1/CX-2

Natural Sound Stereo Power Amplifiers

## MX-1/MX-2

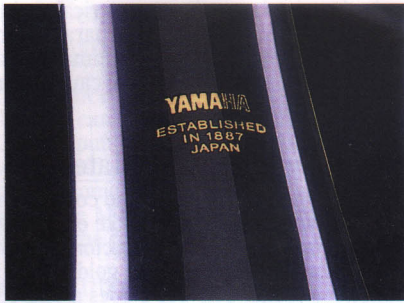
### The Yamaha Commitment

Sounds, especially musical ones, have the power to affect us deeply, awakening our innermost feelings and stimulating our imaginations to reach out beyond previous limitations. Yamaha's unvarying commitment is to create better ways of bringing you sounds of such purity and depth, they will not only give you pleasure, but will expand and enrich your life.



# Yamaha Separate Amplifiers: The Essence of Purity





**F**or the past two decades, Yamaha has been producing fine amplifiers. In fact, we've produced some of the finest

in the world. It's a tradition we are proud of, and continuing it is a commitment we take seriously. Which is why we are extremely pleased to present our new line of separate amplifiers. Two power amplifiers and two preamplifiers that embody the essence of purity in audio performance.

This was achieved with an approach we call "Back to the basics." Rather than adding complex new features and circuitry designed to "tweak" the sound, we simplified the design and concentrated on maximizing basic quality. This entailed making certain that each and every part, no matter how large or small, was absolutely the best available for that job. It meant redesigning circuit boards and wiring to ensure the shortest, most direct path for the signal (and hence, lowest distortion). And it meant exhaustive testing and refining to achieve the highest possible sound quality.

If you've reached the point where audio quality means more to you than pretty panels and fancy features, you're ready for Yamaha separate amplifiers.

# Preamplifiers: Exception

## Yamaha's ToP-ART Leaves Nothing to Chance

The fundamental reason behind the high performance of Yamaha audio components is a comprehensive design philosophy that we call ToP-ART. It dictates that every factor that could affect performance is analyzed and optimized. From circuit design to individual internal

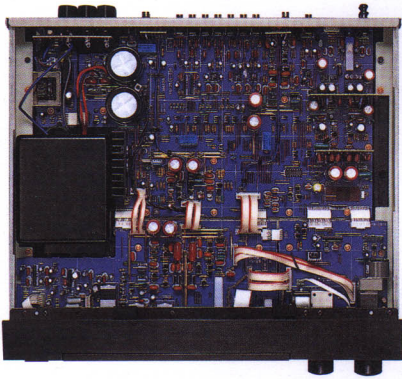
# ToP-ART™

Total Purity Audio Reproduction Technology

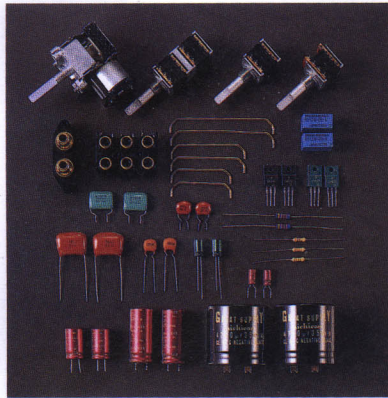
parts to feet and knobs, nothing is left to chance. With the result that each component attains its full potential, so you enjoy the music the way the artist meant it to be heard.

## The Direct Path to Optimum Signal Purity

The photo below of the CX-1's interior shows a conspicuous application of the ToP-ART concept. The path the audio signal travels is straight and direct, so from beginning to end, it encounters the least possible amount of interference.



The CX-1 interior reveals its symmetrical layout and straight input-to-output signal path that contribute to optimum signal purity.



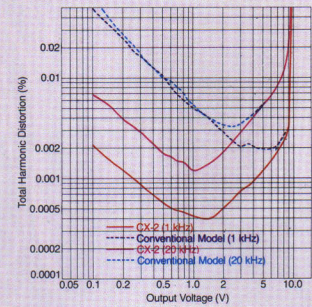
All parts must perform to the highest specifications. In addition, they are extensively tested to ensure that their performance characteristics match the other parts.

The entire interior layout is symmetrical and logical, resulting in extremely high 85 dB channel separation and ultra-low distortion of 0.002%. And for the ultimate in signal purity, you can engage the Pure Direct Switch, causing the signal to bypass the tone control circuitry.

## High Quality Parts and Materials

In the upper reaches of audio component performance, small details and even materials take on increasing importance. Because gold is an excellent conductor and not susceptible to corrosion, these components have gold-plated input terminals and headphone jacks. The CX-1 goes a step further, with 2-pin gold-plated solid brass CD and Pre Out terminals for large-size cables. It also uses extremely thick gold-plated wiring for signal routing. The front and side panels, as well as knobs, are made of extruded aluminum rather than cheaper materials likely to resonate. Even the nuts and bolts are special types, used only in our separate components! Our commitment to quality was total, and the results are worth hearing.

CX-1 THD vs. Output Voltage



As the graphs show, the CX-1's performance characteristics are outstanding with low THD, wide separation, and excellent signal-to-noise ratio.

## CX-1 Natural Sound Stereo Preamplifier



# Naturally Pure Sound Quality

## Versatile Control Centers

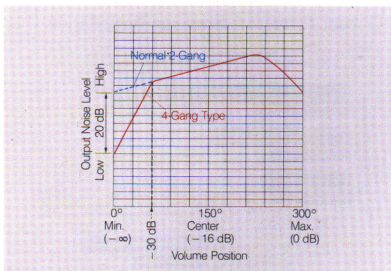
The CX-1 allows you to select seven different inputs (CD, tuner, phono, aux, tape 1/2/3). It also has a Rec Out Selector for direct selection of the source to be recorded and three-way tape copying. This means you can listen to one source while recording another. The CX-2 has inputs for two tape decks and for two VCRs, as well. It also provides a Rec Out Selector.

Both components come with a special Power Link cable for connecting them to the MX-1 or MX-2, so the power amp will turn on and off with the preamp.

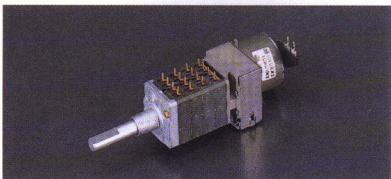
## Other Notable Features

- 20 dB Volume Control Amplifier Using Pure Capacitive Negative Feedback Circuitry (CX-1)
- Low-Noise Precision 4-Gang Master Volume Control
- High Accuracy Twin-Element Phono EQ Amplifiers
- Switchable Phono Subsonic Filter eliminates the rumble which some turntables may produce.
- Center Defeat Bass and Treble Controls

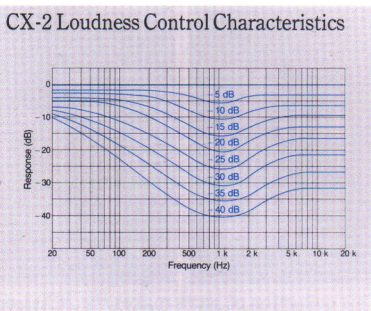
- Remote Controllable, Motor-Driven Volume Control and Input Selector eliminate the noise and distortion inherent in electronic switching systems.
- Continuously Variable Loudness Control (CX-2) maintains natural tonality at all listening levels.
- XL-AV (Extra-Large, Anti-Vibration) Feet specially designed to ensure that external vibrations cannot affect amplifier performance.
- CX-1: 30-Key Remote Control
- CX-2: 63-Key Learning-Capable Remote Control
- Yamaha System Remote Control Capability: Allows you to control the major function of other Yamaha system components (CD player, cassette deck, tuner, turntable) from the amplifier's remote unit.



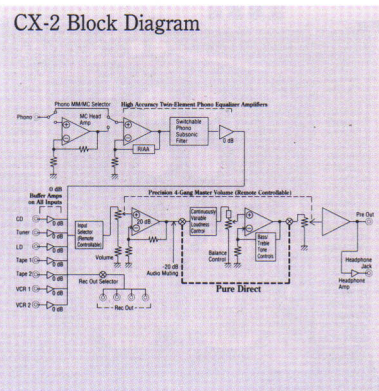
Output Noise Level  
(4-Gang Volume vs. 2-Gang Volume)



4-Gang Volume Control



The CX-2's Continuously Variable Loudness Control adjusts for the ear's loss of tonal response at low volume levels, so as you turn down the volume, natural response is maintained.



The CX-2 block diagram shows the straight signal path. Also note the buffer amps for all inputs and the Pure Direct path that bypasses three other circuits.

## CX-2 Natural Sound Stereo Preamp



# Power Amplifiers: New

## ToP-ART Ensures Top Quality

Like the preamplifiers, the MX-1 and MX-2 benefit from Yamaha's ToP-ART design policy. Every single part was carefully considered during their development, so you can be sure you're purchasing a component with the finest quality throughout. A number of these parts are particularly noteworthy. They use twin massive power transformers and twin heavy-duty extruded aluminum heat sinks. Their block capacitors are extremely large (MX-1: 36,000  $\mu\text{F} \times 2$  and 33,000  $\mu\text{F} \times 2$ ), and all PC board wiring is extra-thick and gold-plated. To support these heavy components and prevent vibration, they have a special ART base inside the chassis. It has a double panel structure, each 1.6 mm thick, and the MX-1 adds extra damping material between the two panels. If these two amps sound

# ToP-ART™

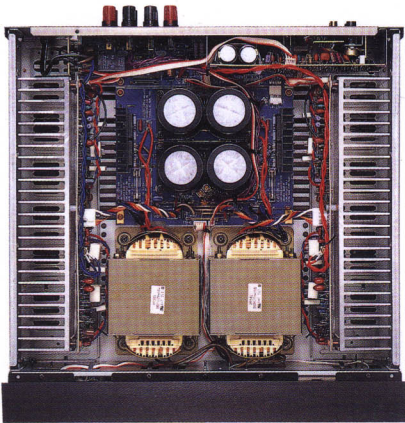
Total Purity Audio Reproduction Technology

weighty, they are: try picking one up. But remember, those heavy parts are where the power comes from.

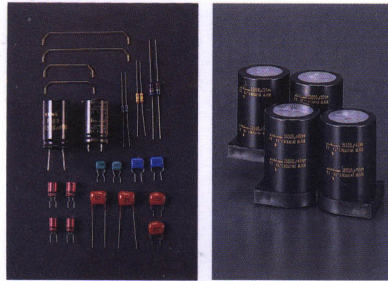
## Huge Power Output and Low-Impedance Drive Capability

The MX-1 delivers 200 watts per channel of RMS power at 8 ohms, and 350 W at 2 ohms. MX-2 output is 150 W at 8 ohms and 250 W at 2 ohms. Note that both of these amplifiers are rated for continuous output power all the way down to 2 ohms—impossible for most amplifiers because lower impedances cause much higher amounts of distortion. This means that these amps can be used with low impedance speakers and will function flawlessly even under fluctuating loads caused by variations in the music signal.

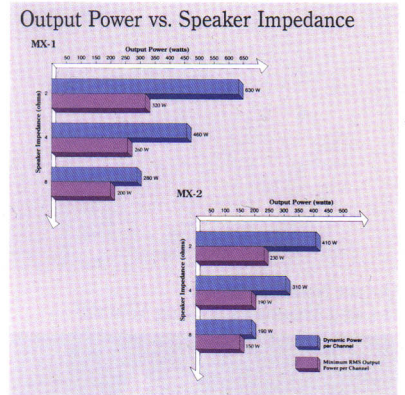
Dynamic power levels, or the ability to deliver momentary power levels beyond the RMS power rating, are also exceptionally high. 280/610 W (8/2 ohms) for the MX-1 and 190/400 W (8/2 ohms) for the MX-2. This ability is especially important when playing CDs, which have a very wide dynamic range.



Like the other separate components, the MX-1 has a symmetrical layout, direct signal path and extra-thick wiring. Note the massive power transformers and large heat sinks.

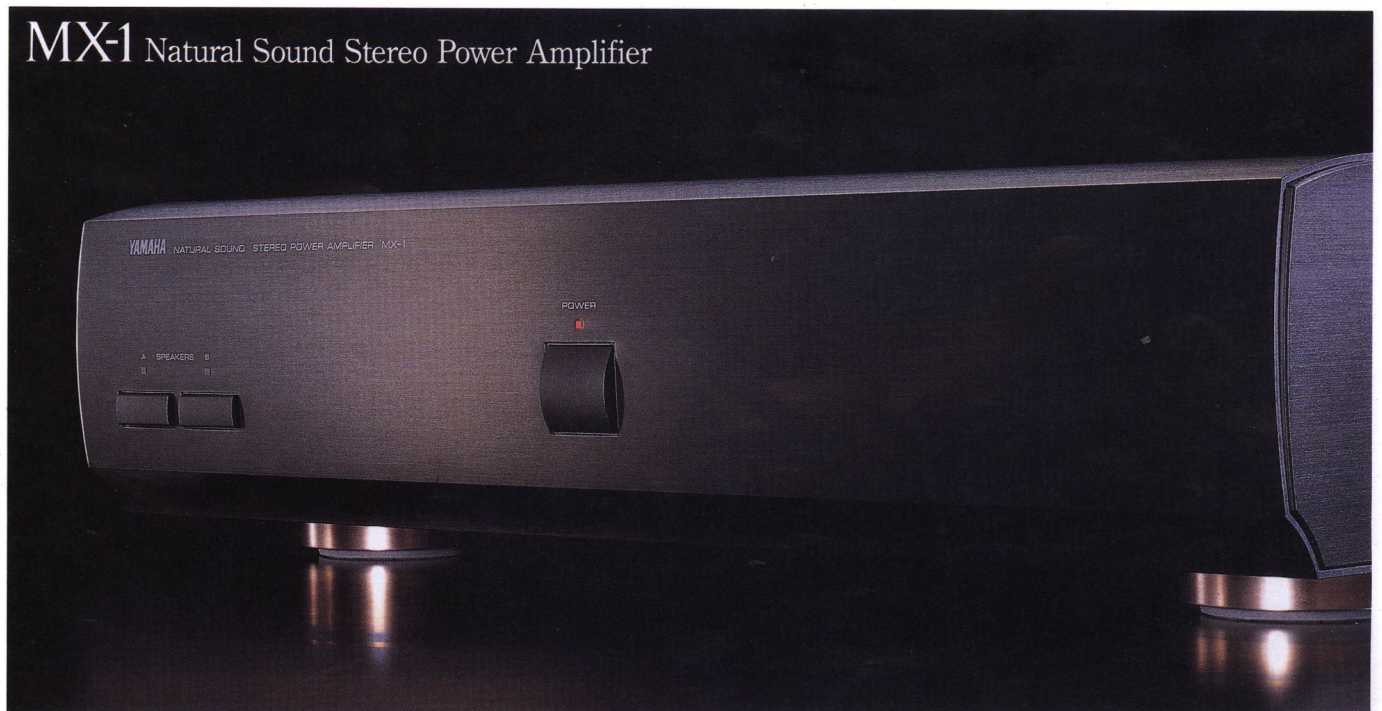


This collection of parts makes the MX-1 one of the world's finest amplifiers.



The MX-1 and MX-2 not only give you plenty of power all the way down to 2-ohm impedances, they have extra reserve power (Dynamic Power) to handle the high-energy peaks of digital audio.

## MX-1 Natural Sound Stereo Power Amplifier



# Heights of Performance

## HCA (Hyperbolic Conversion Amplification)

High performance amplifiers generally use Class A amplification, but the Yamaha-developed HCA circuit goes a step beyond conventional Class A. In a Class A amplifier, when output exceeds a limit determined by the idling current, operation degrades to Class AB, resulting in increased crossover and switching distortion. HCA eliminates this problem by obtaining its output from hyperbolic conversion. So there's less distortion, a wider range of linear operation, and less heat generation.

## APS (Advanced Power Supply)

An amplifier's power supply circuitry is one of the critical determinants of its overall performance. If it does not provide a constant voltage, the power transistors will not be able to perform properly. At low power levels, ordinary power supplies are adequate, but at middle and high levels, especially at low impedances, voltage irregularities called ripple are likely to occur. Yamaha's APS circuitry prevents ripple, maintaining

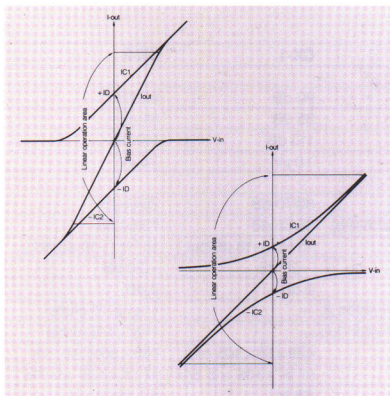
precisely constant voltage at all power levels.

## New Linear Damping Circuit

The damping factor of an amplifier is its ability to stop the speaker cone from vibrating when it shouldn't, that is, when the signal stops. Level variations due to high amp impedance tend to reduce the damping factor, and frequency variations cause it to fluctuate. This new circuit cancels the effect of these variations, maintaining an extremely high, stable damping factor (350 at 8 ohms, 20–20,000 Hz). The result is superior articulation of all sounds and significantly improved frequency response.

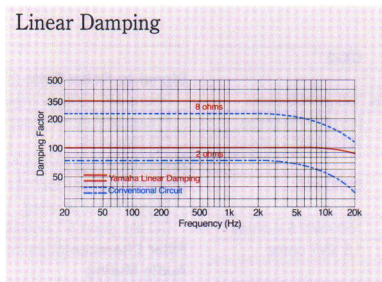
## Other Notable Features

- L/R Level Controls (on rear panel)
- Gold-Plated Input Jacks (MX-1 Jacks are Solid Brass)
- XL-AV (Extra-Large, Anti-Vibration) Feet
- 2-Way Binding Speaker Terminals (Banana Plug Compatible)



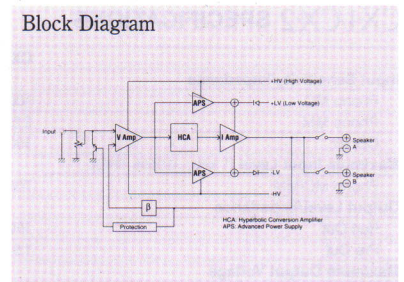
Left: Conventional Class A Operation  
Right: HCA Operation

## Linear Damping



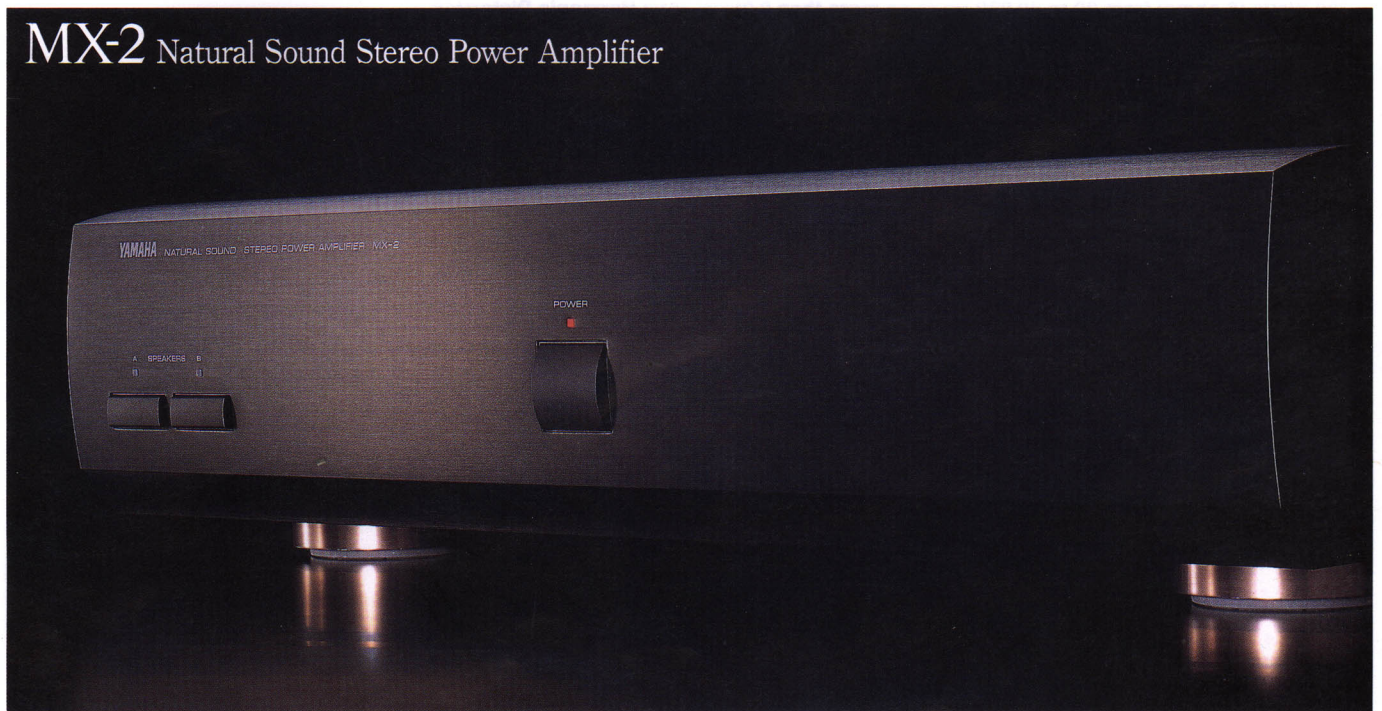
Yamaha's new Linear Damping circuit maintains a high, stable damping factor even at frequencies, where it usually falls off.

## Block Diagram



MX-1 block diagram showing the position of the HCA and APS circuits.

## MX-2 Natural Sound Stereo Power Amplifier





CX-1 Rear Panel



CX-2 Rear Panel



CX-1 Hidden Panel



CX-2 Hidden Panel



CX-1 Remote Control Unit

CX-2 Remote Control Unit (Learning Capable)

## CX1/CX-2 SPECIFICATIONS

	CX-1	CX-2
<b>Input Sensitivity/Impedance</b>		
Phono MC	100 $\mu$ V/1 k, 220 ohms	100 $\mu$ V/100 ohms
Phono MM	2.5 mV/47 k-ohms	2.5 mV/47 k-ohms
CD, etc.	150 mV/47 k-ohms	150 mV/47 k-ohms
<b>Maximum Input Level</b> (1 kHz., 0.05% THD)		
Phono MC/MM	7/180 mV	6/150 mV
<b>Output Level/Impedance</b>		
Rec Out	150 mV/2.5 k-ohms	150 mV/2.5 k-ohms
Pre Out	1.5 V/47 ohms	1.5 V/47 ohms
<b>Maximum Output Voltage</b> (20 to 20,000 Hz, 1% THD)	10 V	10 V
<b>Headphone Rated Output</b>	4.5 V/68 ohms (RL=100 ohms)	4.0 V/68 ohms (RL=150 ohms)
<b>Frequency Response</b> (20 to 20,000 Hz, CD etc.)	$\pm 0.2$ dB	$\pm 0.2$ dB
<b>RIAA Equalization Deviation</b> (Phono MC/MM)	$\pm 0.2$ dB/ $\pm 0.2$ dB	$\pm 0.3$ dB/ $\pm 0.2$ dB
<b>Total Harmonic Distortion</b> (20 to 20,000 Hz)		
Phono MC to Rec Out (3 V)	0.003%	0.004%
Phono MM to Rec Out (3 V)	0.002%	0.002%
CD, etc. to Pre Out	0.002% (3 V)	0.002% (1.5 V)

	CX-1	CX-2
<b>Signal-to-Noise Ratio</b> (IHF-A-Network)		
Phono MC (500 $\mu$ V Input Shorted)	90 dB	82 dB
Phono MM (5 mV Input Shorted)	95 dB	94 dB
CD (Shorted)	110 dB	110 dB
<b>Residual Noise</b> (IHF-A-Network)	1.0 $\mu$ V	1.0 $\mu$ V
<b>Channel Separation</b> (Vol: -30 dB)		
Phono (Input Shorted, 1 kHz/10 kHz)	80/70 dB	75/65 dB
CD etc. (Input 5.1 k-ohms terminated, 1 kHz/10 kHz)	85/65 dB	75/60 dB
<b>Filter Characteristics</b> (Subsonic)	15 Hz (-18 dB/oct.)	15 Hz (-18 dB/oct.)
<b>Audio Muting</b>	-20 dB	-20 dB
<b>Gain Tracking Error</b> (0 to -60 dB)	2 dB	2 dB
<b>Video Input Sensitivity/Impedance</b> (VCR1/VCR2/LD)	—	1 Vp-p/75 ohms
<b>Video Output Level/Impedance</b> (VCR/Monitor Out)	—	1 Vp-p/75 ohms
<b>Dimensions</b> (W x H x D)	438 x 86 x 405 mm (17-1/4" x 3-3/8" x 15-15/16")	435 x 86 x 319 mm (17-1/8" x 3-3/8" x 12-9/16")
<b>Weight</b>	8.8 kg (19 lbs. 6 oz.)	5.4 kg (11 lbs. 14 oz.)

Specifications subject to change without notice.

## MX1/MX-2 SPECIFICATIONS

### MX-1 Minimum RMS Output Power per Channel:

200 Watts (8 ohms) from 20 to 20,000 Hz at no more than 0.008% Total Harmonic Distortion

260 Watts (4 ohms) from 20 to 20,000 Hz at no more than 0.03% Total Harmonic Distortion

320 Watts (2 ohms) from 20 to 20,000 Hz at no more than 0.09% Total Harmonic Distortion

### MX-2 Minimum RMS Output Power per Channel:

150 Watts (8 ohms) from 20 to 20,000 Hz at no more than 0.008% Total Harmonic Distortion

190 Watts (4 ohms) from 20 to 20,000 Hz at no more than 0.03% Total Harmonic Distortion

230 Watts (2 ohms) from 20 to 20,000 Hz at no more than 0.09% Total Harmonic Distortion

	MX-1	MX-2
<b>Dynamic Power per Channel</b> (by IHF Dynamic Headroom Measuring Method) (8/4/2 ohms)	280/460/630 W	190/310/410 W
<b>Dynamic Headroom</b> (8/4/2 ohms)	1.46/2.48/2.94 dB	1.03/2.12/2.51 dB
<b>Power Bandwidth</b> (8 ohms, 0.03% THD, Half Rated Power)	10 to 60,000 Hz	10 to 60,000 Hz
<b>Damping Factor</b>		
(SPA, 8 ohms, 20 to 20,000 Hz)	350	350
(8 ohms, 1 kHz)	250	250
<b>Input Sensitivity/Impedance</b> (Main In)	1.46 V/20 k-ohms	1.26 V/20 k-ohms
<b>Frequency Response</b> (20 to 20,000 Hz, Main In)	$\pm 0.5$ dB	$\pm 0.5$ dB

	MX-1	MX-2
<b>Signal-to-Noise Ratio</b> (IHF-A-Network)		
Main In (Shorted)	125 dB	123 dB
<b>Residual Noise</b> (IHF-A-Network)	20 $\mu$ V	20 $\mu$ V
<b>Channel Separation</b> (Vol: -30 dB, Main In, Input 5.1 k-ohms terminated)		
1 kHz/10 kHz	80/60 dB	80/60 dB
<b>Dimensions</b> (W x H x D)	438 x 116 x 486 mm (17-1/4" x 4-9/16" x 19-1/8")	435 x 116 x 486 mm (17-1/8" x 4-9/16" x 19-1/8")
<b>Weight</b>	24.0 kg (52 lbs. 14 oz.)	19.5 kg (43 lbs.)

Specifications subject to change without notice.

For details please contact:

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