YAMAHA CR400

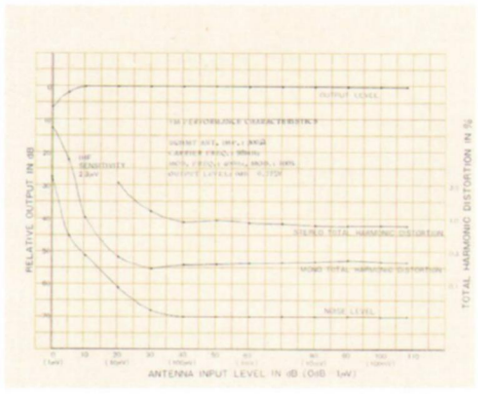
STEREO FM/AM RECEIVER WITH DUAL TUNING METERS AND MIC MIXING

Unusual versatility, outstanding value in a new computer-designed stereo receiver.

Yamaha's computer-designed CR-400 AM/FM stereo receiver offers guaranteed performance specifications, clean power, and a wealth of important features unique in its price range. Important features include dual tuning meters, microphone mixing, quick-connect rear panel terminals, and a strikingly attractive wood finished cabinet. Clean power is assured by rugged up-to-date circuitry, and direct-coupled pure-complementary OCL power amplifier design.

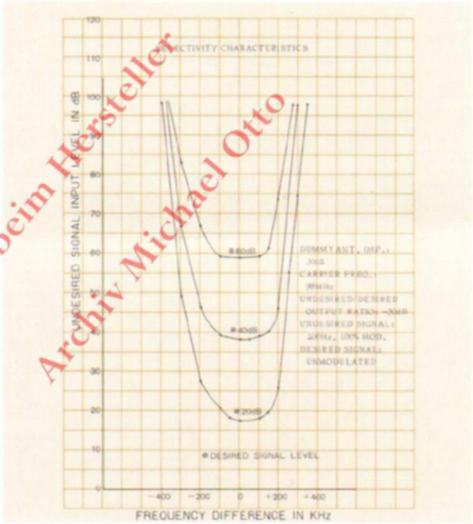
Superior FET FM Front End

The FM front end is where you look to determine a tuner's excellence, for this is where the tuner selects your favorite station and converts the RF signal to IF. In the CR-400, this task is efficiently accomplished by the use of a low-noise FET (Field Effect Transistor) in its RF amplifier and a 3-gang tuning capacitor. These are fine solid state components, usually employed only in quite expensive tuners or receivers.



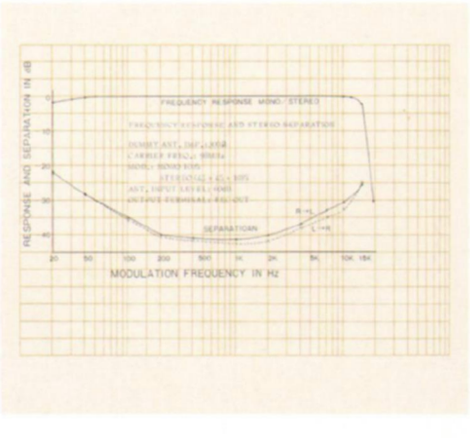
IC and Ceramic Filter FM IF Amplifier

The FM IF amplifier uses three bi-resonator ceramic filters and an IC to obtain an impressive 65dB selectivity (IHF). There is also a sharp-cutting bi-resonator ceramic filter used for the muting circuit which eliminates FM inter-station noise and reduces the sound of the annoying click noise heard often when the tuner leaves a station. The point of all this technology is actually quite simple: your choice FM stations are received with satisfying clarity at all times.



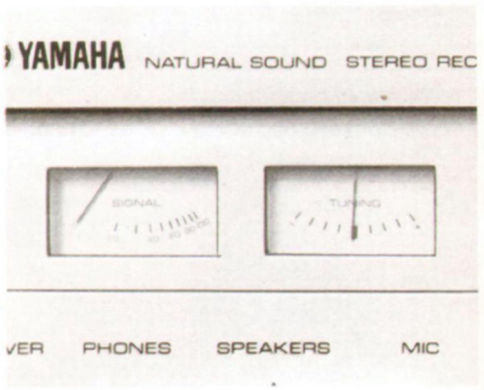
IC Multiplex Demodulator

The FM multiplex demodulator uses balanced integrated circuitry for excellent stereo separation and stability. It includes a carrier leak filter to reduce carrier leakage to less than 40dB. If you choose to record off FM onto tape, beat interference caused by the tape recorder bias frequency is eliminated.



Dual Tuning Meters

Pinpoint tuning is assured with the CR-400, thanks to two tuning meters. There is a signal strength meter for AM and FM. And a center-of-channel meter that lets you tune to the center of the FM discriminator output where distortion is minimal and stereo separation is maximal.



Permanent Light-Emitting-Diode Indicators for Power and FM Stereo

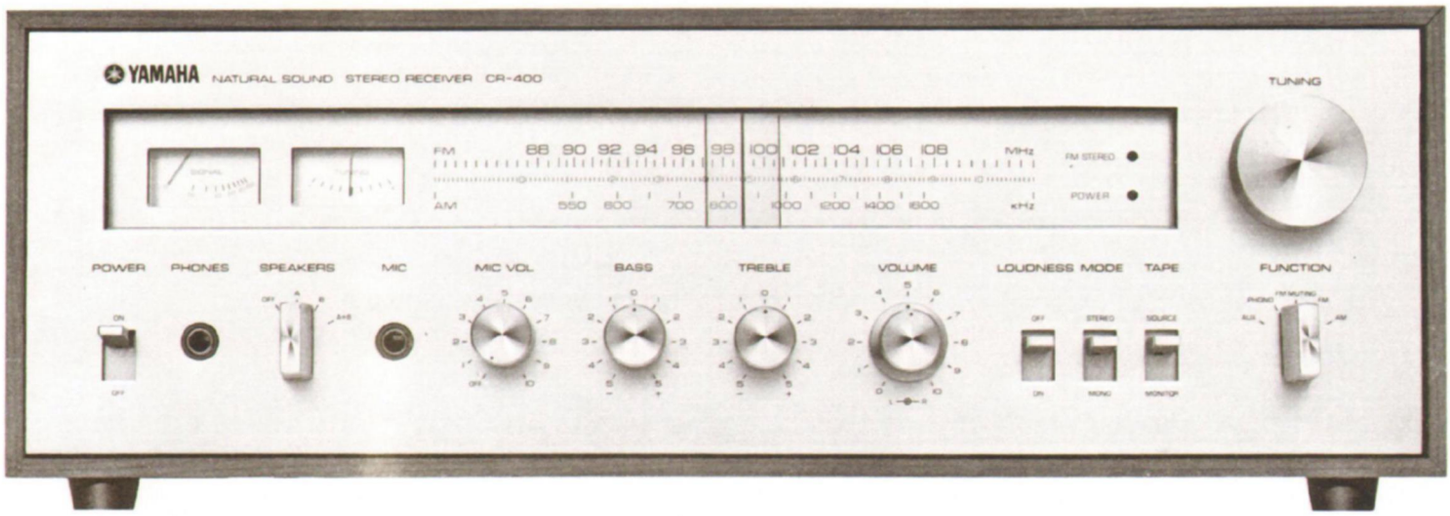
Both power and FM STEREO indicators are unique. They are the light-emitting diode lamps which will last a lifetime. Of course, the FM tuner changes automatically to stereo reception when the station being received changes from mono to stereo broadcasting.

Wide, Precise, Ultra-Smooth Tuning Dial

The dial of the CR-400 is the professional slide rule type—wide, precise, smooth and durable. There is also an extremely smooth dial mechanism that moves the dial pointer smoothly without backlash or vertical wobbling. It is another aid to fast, pinpoint tuning.

Sensitive AM Tuner

You'll receive AM broadcast signals very clearly because Yamaha has used a ceramic filter IF amplifier and an oversized ferrite bar antenna in the CR-400.



Advanced Three-Stage Direct-Coupled Phono Equalizer

The phono equalizer is a three-stage direct-coupled amplifier using a pair of monolithic IC's. This helps to keep distortion minimal. And assures an excellent 72dB-or-better signal-to-noise ratio (IHF). Another vital specification: The phono equalizer has an input capacity of up to 135 millivolts RMS (1KHz, 0.5%). As its rated input sensitivity is 3 millivolts, this indicates that the equalizer amplifier can handle an input signal 45 times (or 33dB) greater than what is necessary to drive it to its full output rating. Naturally, with performance specifications like these, it would be unusual to ever distort the equalizer output. And, since the equalizer virtually duplicates the RIAA disc playback curve, keeping any possible deviation within tolerances of ±0.7dB, you are assured of excellent and transparent tonal quality. Which is pretty much the name of the game in good stereo sound.

Low-Distortion, Effective Tone Controls

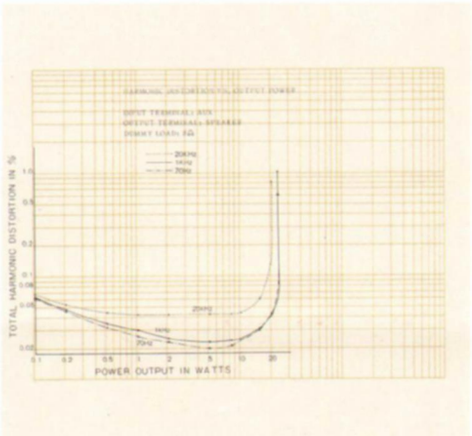
Many medium-priced stereo receivers have some kind of tone control system. Only the very advanced have a tone control amplifier like the one Yamaha built into the CR-400. It adopts a unique collector-to-emitter negative feedback to better achieve low-distortion, optimum tone control curves. With controls set in their zero positions, the curves are perfectly flat over the entire audio spectrum. The Bass control is continuously adjustable by ±10dB (at 50Hz); the Treble control ±10dB (at 10KHz).

Microphone Mixing and Recording

Another important plus for the CR-400: the independent three-transistor microphone amplifier with exclusive microphone volume control. (Most amplifiers in this price range use the equalizer amplifier for this function.) This mic amplifier has a high 450mV input capaccity, enabling it to accept an input signal 150 times (or 43dB) greater than what is required to drive it to its full output. The advantage to you is that you can use a microphone for public address functions, or mix it with records, FM/AM radio and tapes—all without fear of distortion. If you wish, you may even record what you mix into a tape deck.

Direct-Coupled OCL Pure Complementary Power Amplifier

The CR-400 delivers all the power you could really ever use for normal home music listening. The power amplifier direct-couples a differential amplifier and all of its other key stages, including an OCL pure complementary output stage. It also employs a DC feedback technique between the differential amplifier and the subsequent stages. The result is very low distortion at all output levels—less than 0.1%, for instance, at 10W output, in the 20-20,000Hz range. Or less than 0.08% at the very low 200mW output, in the 20-20,000Hz range. How much power? More than 16 watts per channel into 8 ohms, both channels driven, 20-20,000Hz, at the commonly acceptable 0.5% distortion level. As you would expect, the sound is clean and transparent. Of equal significance, the amplifier is complete with a special protection circuit for your speakers.



Subsonic Filter

A special subsonic filter (—3dB at 20Hz, 12dB/octave) cuts out the noise generated by warped records and so forth. Therefore the unnecessary, harmful super-low-frequency vibration of the speaker cone is eliminated.

Highly Stable Power Supply

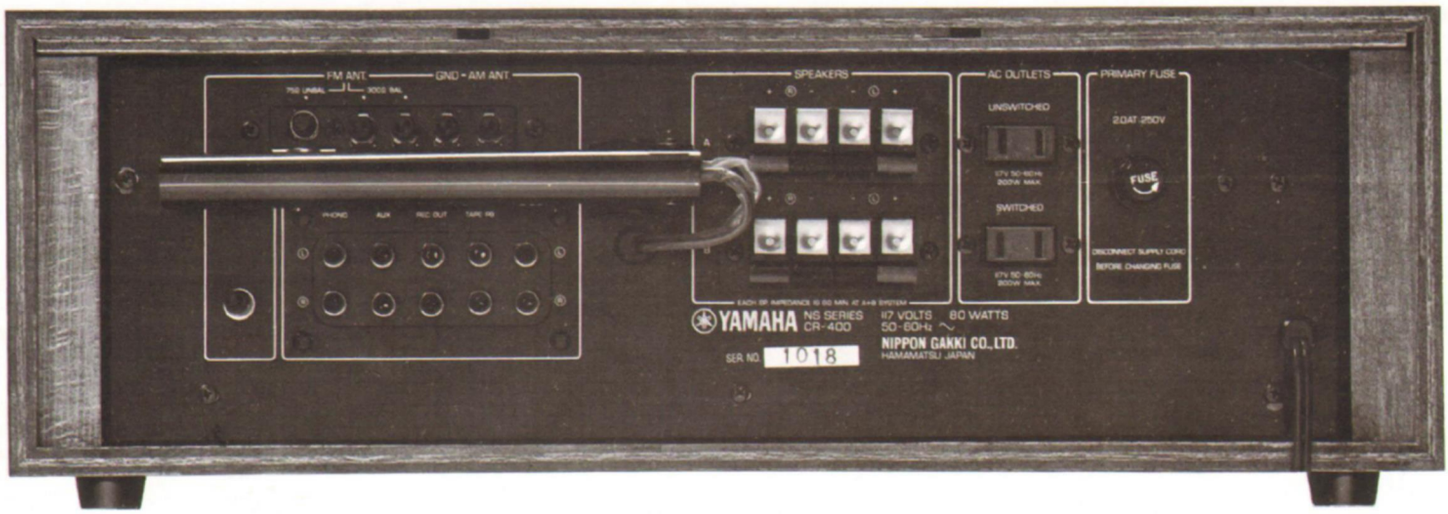
A stereo truth is that closely-regulated power supply voltages result in cleaner, more transparent sound. In the CR-400, this advantage is ensured by the use of a constant-voltage power supply circuit for FM IF, FM MPX, AM circuits and the entire preamplifier section. Fluctuation in line voltage or current amounts can not affect the quality of the output sound.

Two Convenient AC Outlets for Powering Other Components

Connects and Controls up to Two Pairs of Speakers

Specially-Manufactured, Extra-Smooth Lever Switches

Headphone Jack



SPECIFICATIONS

AUDIO SECTION

POWER OUTPUT
Dynamic Power (IHF) 76 watts (4Ω)
56 watts (8Ω)
Continuous RMS Power (each channel driven)
24/24 watts (4Ω) at 1,000Hz
20/20 watts (8Ω) at 1,000Hz
Continuous RMS Power (both channels driven)
20+20 watts (4Ω) at 1,000Hz
18+18 watts (8Ω) at 1,000Hz
Continuous RMS Power (both channels driven)
18+18 watts (4Ω) at 20 to 20,000Hz
16+16 watts (8Ω) at 20 to 20,000Hz

TOTAL HARMONIC DISTORTION
Power Amplifier Only (AUX to Power Amp.)
less than 0.1% at 1 watt
Overall (AUX to Power Output)
less than 0.5% at rated power
INTERMODULATION DISTORTION
(70Hz : 7,000Hz=4:1 SMPTE method)
Power Amplifier Only (AUX to Power Amp.)
less than 0.1% (8Ω) at 1 watt
Overall (AUX to Power Output)
less than 0.1% (8Ω) at rated output
POWER BANDWIDTH (IHF, distortion 0.5% const.)
15 to 50,000Hz
FREQUENCY RESPONSE (at 1 watt)
Overall (AUX, TAPE PB to Power Output)
20 to 50,000Hz +0.5dB, −3dB
Overall (MIC to Power Output)
100 to 10,000Hz +0.5dB, −6dB
Deviation from RIAA (30 to 15,000Hz)
+0.7dB, −0.7dB
LOAD IMPEDANCE 4 to 16Ω
DAMPING FACTOR (8Ω) 40 at 1,000Hz
CHANNEL SEPARATION (at rated power, 1,000Hz)
Overall from PHONO 1, 2 50dB
Overall from AUX, TAPE PB 50dB
Overall from MIC 50dB
HUM AND NOISE (IHF, Closed circuit A Network)
Overall from PHONO 1, 2 better than 72dB
Overall from MIC better than 65dB
Overall from AUX, TAPE PB better than 85dB
Volume at Minimum better than 85dB
INPUT SENSITIVITY AND IMPEDANCE
(at rated power, 1,000Hz)
PHONO 1 3mV (50kΩ)
PHONO 1, 2 Max. Input Capability
135mV (T.H.D. 0.5%)
MIC 3mV (50kΩ)
MIC Max. Input Capability
450mV (T.H.D. 0.3%)
AUX 150mV (100kΩ)
TAPE PB 150mV (100kΩ)
OUTPUT LEVEL AND IMPEDANCE
(at rated power, 1,000Hz)
TAPE REC OUT 150mV (10kΩ)
PRE OUT 200mV (3kΩ)
TONE CONTROLS
BASS +10dB, −10dB at 50Hz
TREBLE +10dB, −10dB at 10,000Hz
LOUDNESS CONTROL
+8dB at 100Hz, +4dB at 10,000Hz

TUNER SECTION

FM:
Tuning Range 88 to 108MHz
Usable Sensitivity (IHF) 2.5μV
Image Frequency Rejection 55dB
IF Rejection 75dB
Spurious Response Rejection 75dB
AM Rejection 50dB
Capture Ratio 2.0dB
Alternate Channel Selectivity (IHF) 65dB
Signal-to-Noise Ratio 68dB
Total Harmonic Distortion
MONO 0.3% at 400Hz
STEREO 0.8% at 400Hz
Stereo Separation 40dB at 400Hz
25dB at 50 to 10,000Hz
Frequency Response
+1.0dB, −1.0dB at 50 to 10,000Hz
+1.5dB, −3dB at 20 to 15,000Hz
Sub-Carrier Suppression 40dB
Muting Override Signal Level 10μV
Antenna Impedance 300Ω balanced
75Ω unbalanced

AM:
Tuning Range 525 to 1,605kHz
Usable Sensitivity (IHF) 52dB/m
Signal-to-Noise Ratio 43dB at 80dB/m
Image Frequency Rejection 45dB at 1,000kHz
Selectivity 25dB at 1,000kHz
IF Rejection 40dB at 1,000kHz

GENERAL

Semiconductors
4 IC's; 3 FET's; 38 Transistors;
2 LED's; 22 Diodes; 1 Zener Diodes
Power Source AC 117V, 50/60Hz
Power Consumption
Max. 130 watts
Rated 80 watts
AC Outlets
Switched 1 (200 watts)
Unswitched 1 (200 watts)
Dimensions 444mm (17½") W×158mm (6¼")H
×300mm (11¾")D
Weight 9.5kg (20.9lbs)

Design and specifications subject to change without notice for improvements.

For details please contact:

SINCE 1887 YAMAHA
NIPPON GAKKI CO., LTD. HAMAMATSU, JAPAN