YAMAHA CT-1010

Natural Sound FM/AM Stereo Tuner

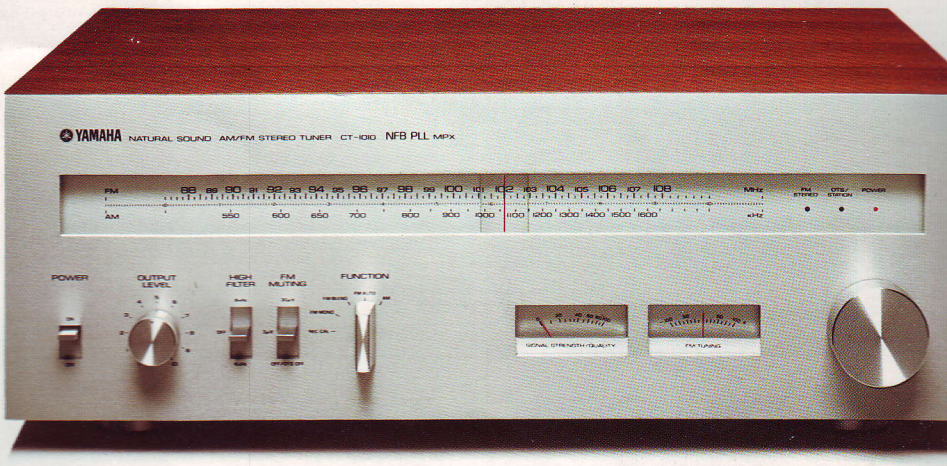
Full Negative Feedback MPX Section

Inverted Phase Pilot Signal Canceller

Unique Optimum Tuning System

Wide Air Gap Five Gang Tuning Capacitor

Yamaha: Dedication to Musical Excellence



Today the world's largest manufacturer of musical instruments is also a leader in audio fidelity. For nearly a hundred years Yamaha craftsmen have been designing full, natural sound into our renowned pianos, organs, wind and string instruments—a rich musical tradition that makes us unique in the audio world. Part of the reason is our generations of musical sensitivity. But it's also due to our immense technological and production capabilities—built over decades of supplying fine musical instruments to the world.

The Basics

Audio performance depends upon a wide range of technologies. While Yamaha's computer-controlled circuit design and testing is second to none, our musical instrument experience has given us expertise in many other crucial fields. The Yamaha factories which produce LSIs and semiconductors for our electronic organs were also important in the development of the revolutionary Yamaha vertical FET used in our top-line B-I power amplifier and C-I preamp. They are also responsible for our unique vapor deposition production of the world's only pure beryllium dome speaker diaphragms. After years of blending and forming the metals in our brass instruments, we were able to develop the special alloys used in our powerful speaker magnets. Piano frame diecast techniques are behind the ideal weight and acoustic properties of our turntable platters and speaker frames. And Yamaha piano soundboard research and cabinet woodcrafting is reflected in our resonant-free speaker enclosures and beautifully detailed component cabinetry.

In-House

Every crucial part of every Yamaha audio component is Yamaha-made. That's how we set our own quality standards. And that's how we can afford to innovate every step of the way: when a part or material doesn't do justice to the music we simply develop one that does.

The Payoff

When you have musicians and audio engineers speaking the same language the result is full natural sound fidelity, plus innovative features which translate directly into improved tonality or operating convenience. Yamaha's insistence on total music performance, not just isolated specs, is behind a revolutionary new approach to audio component design—one that gives the CT-1010 tuner music response amazingly faithful to the broadcast signal, audibly superior to others in its class and rivaling many of the world's most expensive components.

A TUNER IN THE GREAT TRADITIO

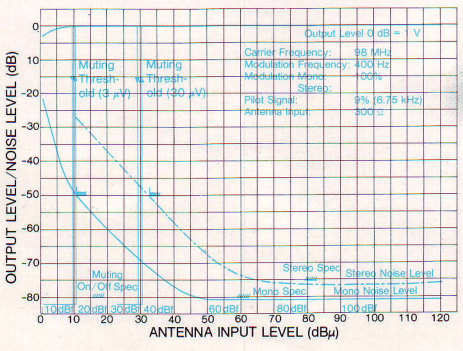
The CT-7000, a super-sophisticated audio component for the spare-no-expenses audiophile, first astonished fans and experts with Yamaha's advanced tuner technology, novel features, and ultra-low distortion natural sound. Now, in the CT-1010, the spin-off from our CT-7000 development program makes the same performance advantages available to a fa wider circle of fans.

Superb Performance

Sensitivity, Stability, and Quality

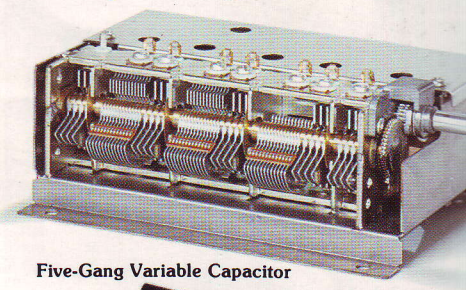
The unusual CT-1010 front-end circuitry and components pick up the most distant, low signal-strength stations with surprisingly high signal-to-noise ratio, excellent stability, and rejection of all forms of interference. This pays off in a much wider choice of stations, and greatly increased listening enjoyment. And not even powerful local stations can seriously overload the CT-1010, so that reception is uniformly good in any area. The front end keeps the incoming signal clean and clear of external interference, and the IF stage is specially designed to prevent internally generated spurious signals from degrading quality. One secret is Yamaha's direct assessment of differential gain, and another is the use of special low loss, low spurious-content ceramic filters and six stages of current-limiter differential amplification!

Output/Noise Level vs. Antenna Input Level

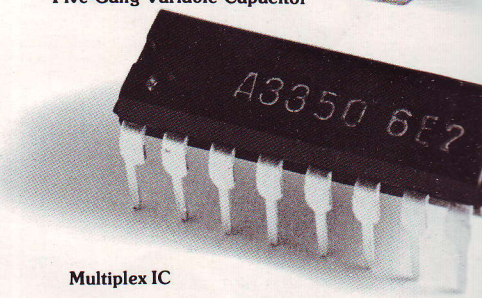


Unique Five-Gang Tuning Capacitor

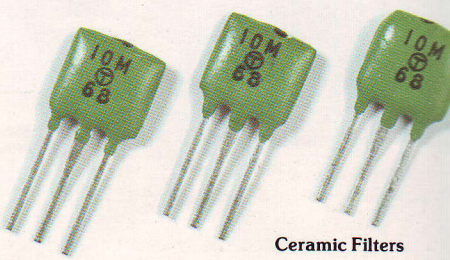
This Yamaha-developed element is precision-formed with air gaps twice as wide as conventional types, for superb frequency calibration, accuracy and stability. It is com plemented by dual gate MOSFETs in the front end RF and mixer stages, and a balanced type ratio detector which combines with two ICs in the IF stage. The results a an ultra-high standard of frequency calibration, complete stability, virtually complete rejection of interference waveforms and wide dynamic range.



Five-Gang Variable Capacitor



Multiplex IC



Ceramic Filters

Unique Negative Feedback Multiplex Section

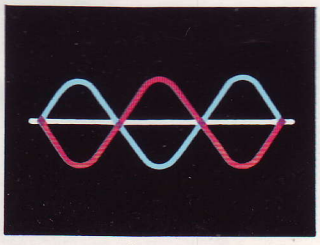
This unique MPX section is convincing evidence of Yamaha's innovative design. First developed for the CT-7000 tuner, the whole MPX section is incorporated into a negative feedback loop, with full NFB reducing distortion to a level where it cannot be measured by the most sensitive test equipment. Phase-locked loop circuitry locks onto the carrier signal for unvarying stability.

Perfect Cancellation of the Pilot Signal

Cutoff filters, often used to prevent the 19 kHz FM stereo pilot signal from interfering with other audio equipment, inevitably suppress high frequency response as far down as 15 kHz. Instead of a cutoff filter, the CT-1010 uses a perfect mirror-image of the pilot signal (inverted phase signal) to cancel it completely, while still allowing treble response to extend as far as 18 kHz.

Red Trace:
19 kHz Pilot Signal

Blue Trace:
Pilot Cancellation Waveform



Outstanding AM Listening, Too!

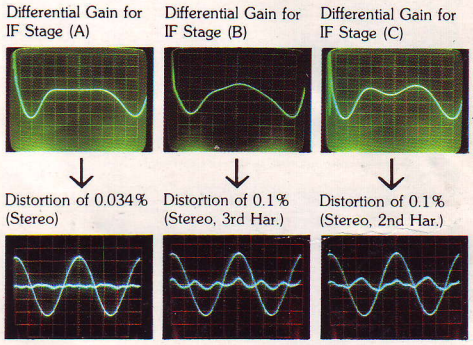
AM reception is often overlooked in today's stress on stereo FM broadcasts. But the AM section of the CT-1010 features a special front end for good signal-to-noise ratio, a peak detector circuit for low distortion at all signal strengths, and a stable anti-fading circuit. The AM signal even passes through the FM multiplex circuit, exploiting its ultra-low distortion without the need for a separate AM circuit (with a special equalizer to compensate for FM frequency response droop). The CT-1010 demonstrates its superiority as clearly in AM reception as it does in FM.

Tested for Perfection

Direct Assessment of Differential Gain

The world famous CT-7000 tuner featured switched narrow/wide selectivity modes for ideal reception under all conditions. In the CT-1010 Yamaha takes this advanced circuit design an important stage further. By using special test equipment which gives a visual display of the critical differential gain linearity, our engineers can combine the best of both mode settings. This means you get the high selectivity of the narrow mode (85 dB) and the extremely low distortion of the wide mode (0.07% for stereo reception at 1 kHz), but without the need to choose between them! The photographs show relationships between typical differential gain characteristics and distortion for the Yamaha circuit (A) and for two typical competitive designs (B and C). Direct visual assessment is far more effective than crude 'group delay time' measurements or the mere use of linear phase filters; it is an overall approach, giving audibly superior results.

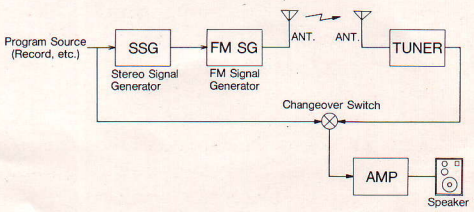
Linear Differential Gain Characteristics



Direct Comparison with the Original Sound

The CT-1010 is more than a tuner with superb radio reception performance characteristics; it also gives astonishingly faithful reproduction of the original broadcast sound. Throughout its long development, Yamaha music specialists listened to a wide variety of sound sources both direct, and then as received via the tuner after FM modulation. By switching between the two signal paths even the most subtle extra coloration introduced by the tuner could be detected and eliminated. The result is dramatic clarity, especially when an FM station is broadcasting 'live' from the studio or concert hall. The increased realism, and the faithful recreation of the live concert atmosphere, is unmistakable.

Direct Comparison Block Diagram

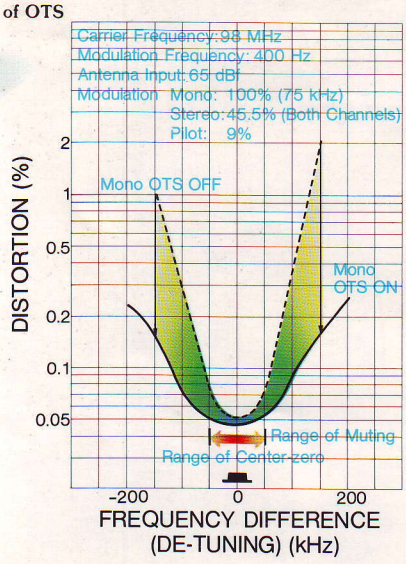


Full Convenience Features

Optimum Tuning System

The Optimum Tuning System locks onto a chosen FM station for the least distortion and best stereo separation. Even if your manual tuning is slightly off-station, the OTS will correct to give crystal-clear reception. To assure easy tuning, the OTS switches off automatically as soon as you touch the tuning knob, and goes into action again after the knob is released. It can also be switched off manually, to let you tune in a weak station next to a very strong one.

Effect of OTS



Triple-Function AM/FM Signal/Quality Meter

In addition to the center-zero FM tuning meter, there is a signal strength meter for AM and FM reception. During FM reception, the needle indicates the presence (and extent) of multipath and other interference by swinging or fluttering. You can easily orient your antenna for the cleanest signal while watching this variation. Similar to the multipath indication in the prestigious CT-7000, this meter versatility is an important aid to top reception.

Comprehensive Noise Reduction

The choice of FM Blend or Mono modes means that even weak FM stations can be enjoyed with good signal-to-noise ratios. Blend provides partial combination of the FM stereo signals, while Mono cleans up particularly difficult signals by full combination (cancellation of the stereo effect). The CT-1010 also incorporates a Noise Filter switch, particularly effective in cutting out high frequency noise on both AM and FM. Try the 8 kHz filter first to remove noise in the extremely high frequency ranges. If interference is still present, use the 4 kHz setting.

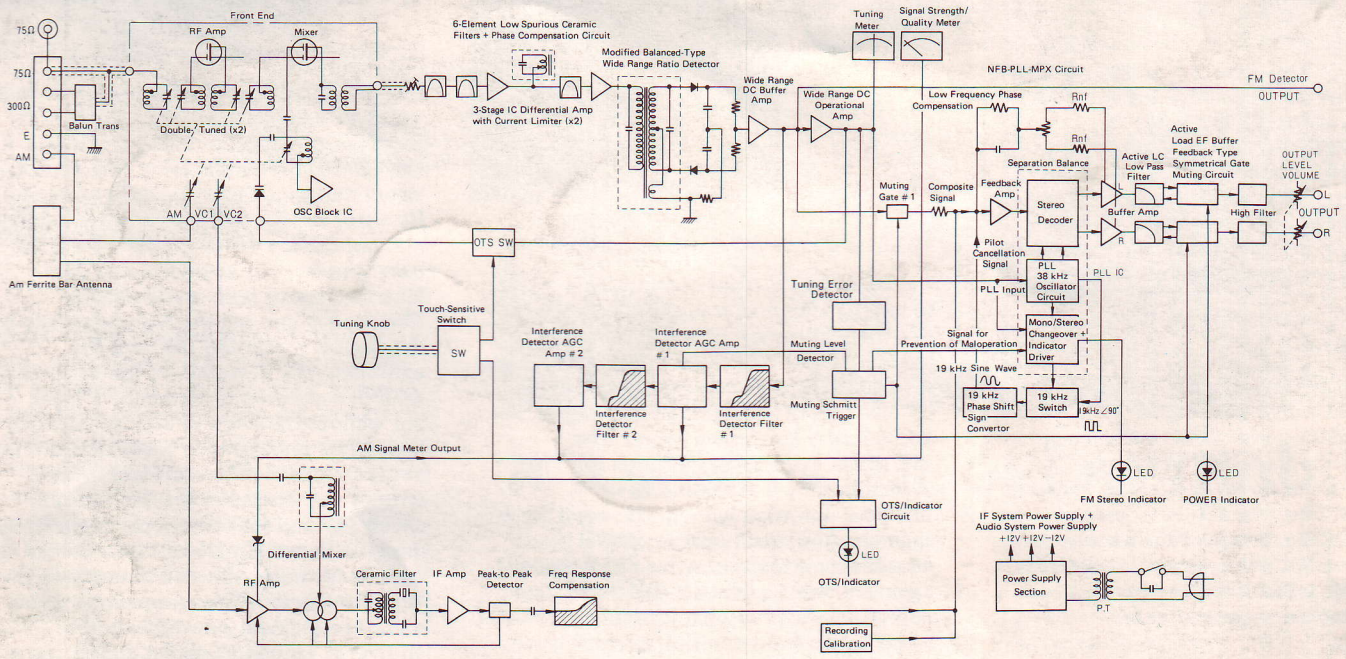
Dual Level Muting

A choice of muting levels, either 3 μV or 30 μV, means that you can choose to ignore all stations except those capable of good stereo reception (30 μV), or include those best listened to in the mono mode (3 μV). With muting off, all stations, even the weakest, will be heard, but so will the inter-station noise.

Simple Tape Deck Level Calibration Signal

A standard 333 Hz signal is provided to make tape deck level setting extra-simple. Like the normal tuner output, it is fully variable, corresponding to the level of 50% modulation.

Block Diagram



SPECIFICATIONS

FM SECTION	
TUNING RANGE	88 to 108 MHz
USABLE SENSITIVITY (IHF, 98 MHz, 10.8 dBf)	
300 Ω	1.9 μV
75 Ω	0.95 μV
50 dB QUIETING SENSITIVITY	
Mono	3.2 μV (15.3 dBf)
Stereo	40 μV (37.2 dBf)
IMAGE RESPONSE RATIO (98 MHz)	110 dB
IF RESPONSE RATIO (98 MHz)	110 dB
SPURIOUS RESPONSE RATIO	
(98 MHz)	110 dB
AM SUPPRESSION RATIO (IHF)	65 dB
CAPTURE RATIO	1.0 dB
ALTERNATE CHANNEL	
SELECTIVITY	85 dB
SIGNAL-TO-NOISE RATIO (at 65 dBf, IHF)	
Mono	80 dB
Stereo	75 dB
DISTORTION (at 65 dBf)	
Mono 100 Hz	0.07%
1 kHz	0.07%
6 kHz	0.15%
Stereo 100 Hz	0.09%
1 kHz	0.07%
6 kHz	0.15%
INTERMODULATION DISTORTION (IHF)	
Mono	0.05%
Stereo	0.1%
SUB-CARRIER PRODUCT RATIO	70 dB
STEREO SEPARATION	
1 kHz	52 dB
50 Hz to 10 kHz	45 dB
FREQUENCY RESPONSE	
50 Hz to 10 kHz	±0.3 dB
30 Hz to 15 kHz	+0.3 −0.5 dB
MUTING THRESHOLD	3 μV (14.8 dBf)
	30 μV (34.8 dBf)
AM SECTION	
TUNING RANGE	525 to 1,605 kHz
SENSITIVITY (IHF, bar antenna)	300 μV/m (49 dB/m)
SELECTIVITY (1,000 kHz)	30 dB
SIGNAL-TO-NOISE RATIO	50 dB (at 80 dB/m)
IMAGE RESPONSE RATIO (1,000 kHz)	55 dB
IF RESPONSE RATIO (1,000 kHz)	40 dB
SPURIOUS RESPONSE RATIO	
(1,000 kHz)	55 dB
TOTAL HARMONIC DISTORTION	0.4% (at 80 dB/m)
AUDIO SECTION	
OUTPUT LEVEL/IMPEDANCE (1 kHz)	
FM (100% mod., Vol. min.—max.)	100 mV—1.0 V/2.5 kΩ
FM (100% mod., Vol. center)	500 mV/2.5 kΩ
AM (30% mod., Vol. min.—max.)	25 mV—250 mV/2.5 kΩ
AM (30% mod., Vol. center)	125 mV/2.5 kΩ
RECORDING CALIBRATION OUTPUT (333 Hz, corr. to FM 50% mod.)	
Vol. min.—max.	50 mV—500 mV/2.5 kΩ
Vol. center	250 mV/2.5 kΩ
GENERAL	
SEMICONDUCTORS	5 ICs, 41 Transistors, 2 FETs,
	12 Diodes, 3 Zener Diodes, 3 LEDs,
	FM 6-element ceramic filter,
	AM 1-element
POWER SUPPLIES	U.S.A. and Canada: AC 120 V, 60 Hz
	Australia: AC 240 V, 50 Hz
	Other Areas: AC 110-130/220-240 V,
	slide switch: 50/60 Hz
POWER CONSUMPTION	8 watts
DIMENSIONS	461 x 170 x 408 mm
	(18⅛" x 6⅝" x 16")
WEIGHT	7.7 kg (16 lbs., 15 oz.)

Specifications subject to change without notice.

For details please contact:

SINCE 1887 YAMAHA

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