

OPTONICA

OWNER'S MANUAL

SA-5602 / SA-5606

FM/AM, FM STEREO RECEIVER

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WARNINGS

Please read this manual before operating the unit.

Exposure to rain or moisture can cause hazard of fire or shock.

Do not place or operate this unit in areas of direct sunlight or high heat (above 104°F/40°C).

Proper ventilation is essential for long life and trouble-free performance. Do not block the air vents on top of the receiver or on the bottom. Do not remove the rubber feet when stacking other units on top of the receiver.

Avoid the use of strong solvents, benzene, thinners, pesticides and strong household cleaners on or near the cabinet. Serious damage to the finish and/or surface may result.

This unit must be used on the specified voltage only. Usage on other than the specified voltage may result in damage, fire or accident.

OPTONICA cannot be responsible for any damage resulting from the use of this unit with unspecified voltages.

When the speaker is set to the "a + b" or to the "a + c" position, each speaker should have at least 8 ohms impedance.

FOR YOUR RECORDS

For your assistance in reporting this unit in case of loss or theft, please record below the model number and serial number which are located on the rear of the unit. Please retain this information.

Model number

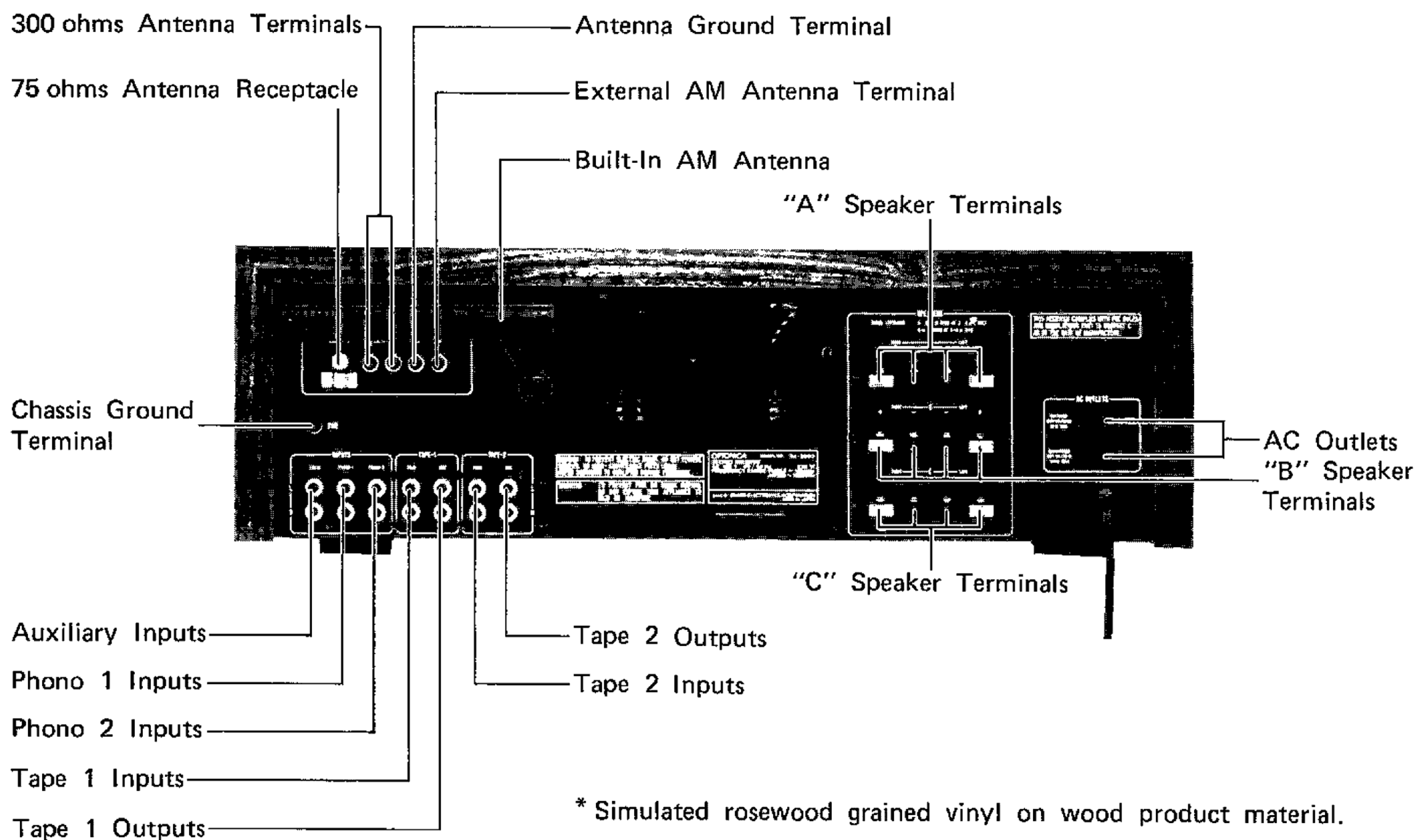
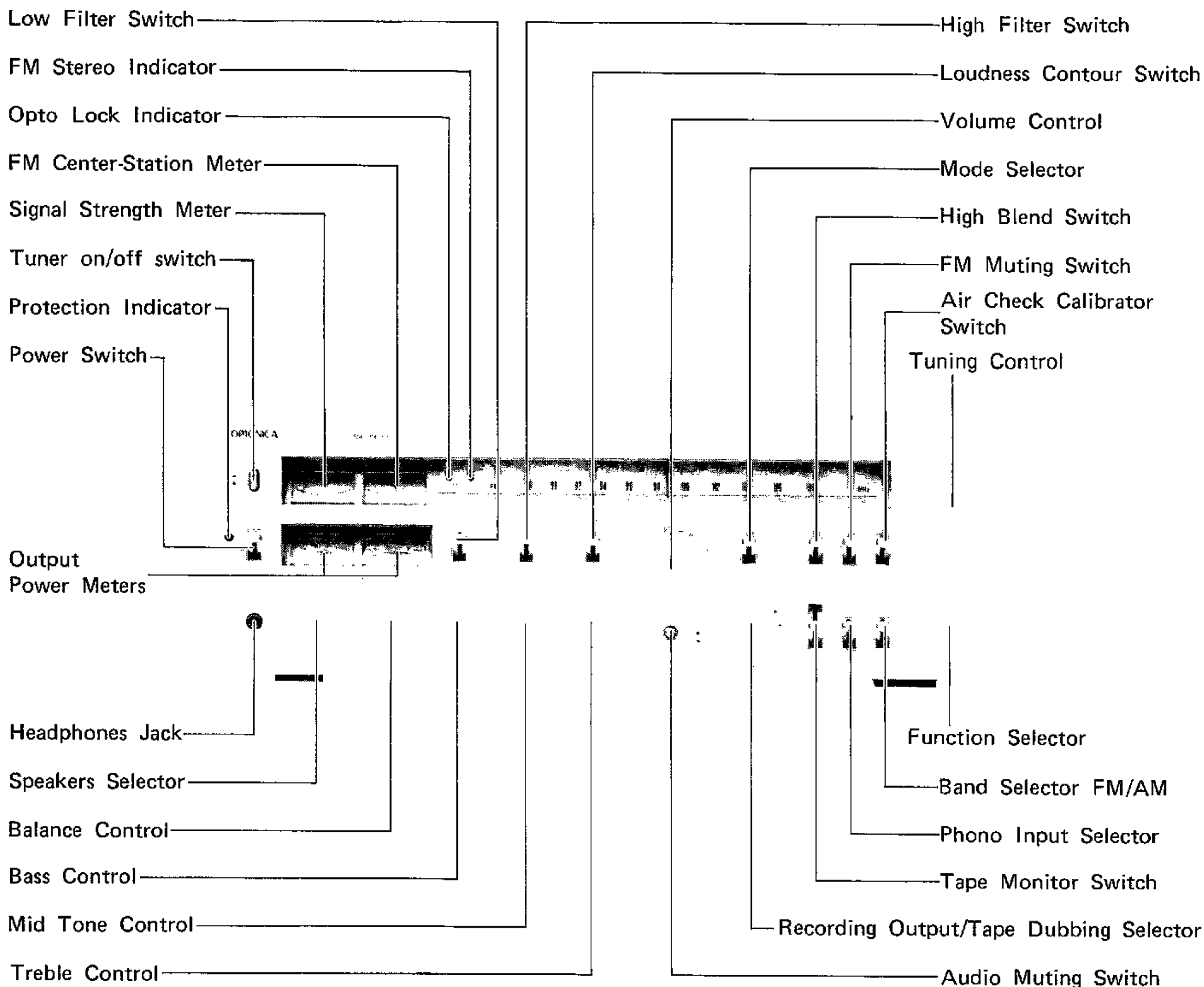
Serial number

Date of purchase

Place of purchase

WARNING: TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

LOCATION OF CONTROLS



FEATURES

AC POWER-AMPLIFIER

DC power-amplification with differential amplifier and direct-coupled complementary OCL circuitry in all stages deliver broad band power with minimum distortion.

DUAL POWER SUPPLY CIRCUITS

Dual power supply circuits are included; Left and Right channels independently. Consequently, both channels become less interfered against each other and also damping factor is remarkably improved.

OUTPUT POWER METERS

Two output meters are provided for the right and left channels to indicate power outputs.

MULTIPLE SPEAKER OUTPUTS

There are connections for three separate pairs of speakers with front mounted control for separate operation or a variety of combinations.

DUAL TAPE INPUTS WITH DUBBING

Complete connection facilities for two tape decks plus a full function tape monitor provide the ability for dubbing on either tape decks.

DUAL PHONO INPUTS

This unit is equipped with connections for two turntables.

SEPARATE RECORDING OUTPUT

With the speaker drive circuit and recording output circuit separated, it is possible to independently record program sources into two tape decks by switching the recording output selector.

TRIPLE TONE CONTROLS

In addition to conventional bass and treble controls, a mid range tone control has been employed in this unit. This allows easy sound quality calibration of the speaker or cartridge according to room acoustics, and satisfying creation of quality sound to your taste.

TUNER ON/OFF

When the tuner is not in use, the circuitry and dial lights can be turned on/off.

HIGH & LOW FILTERS

A pair of filters effectively reduce unwanted noises at both the high and low ends of the sound spectrum.

ADVANCED FM FRONT END DESIGN

A 4-gang variable capacitor, dual gate MOS FET and a differential IF amplifier have been combined for excellent sensitivity and outstanding selectivity.

PLL MULTIPLEX DECODER

A Phase Locked Loop demodulator circuit and inductive type filter improve the FM stereo performance and assure maximum separation and minimum distortion.

FM OPTO-LOCK

Automatically corrects and locks the frequency deviation due to change of ambient temperature and vibration.

DUAL TUNING METERS

A signal strength meter and a FM center-station meter provide exact tuning accuracy.

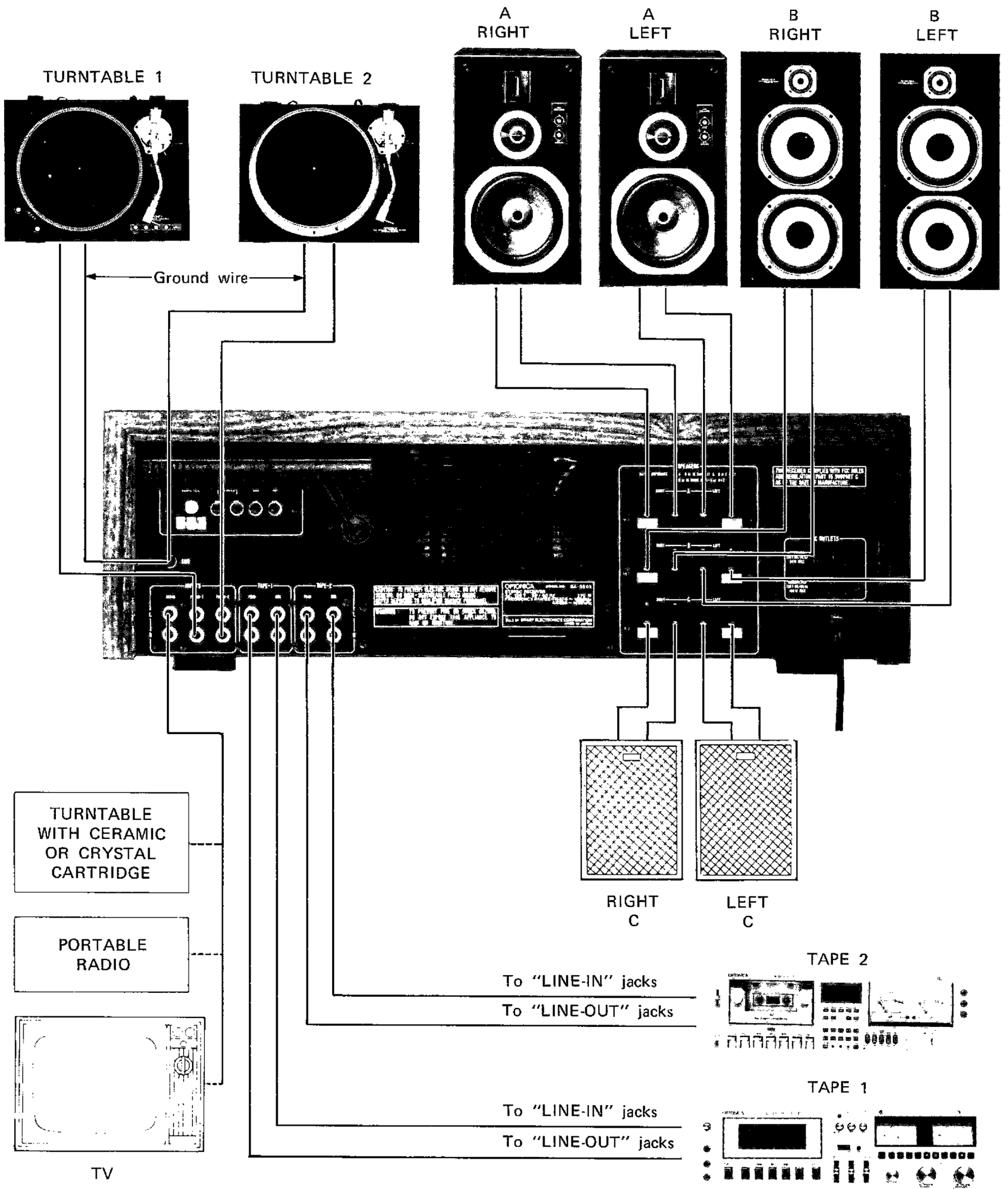
AIR CHECK CALIBRATOR

A special circuit generates a 400Hz tone so that a tape deck can be calibrated to record FM broadcasts at the proper level.

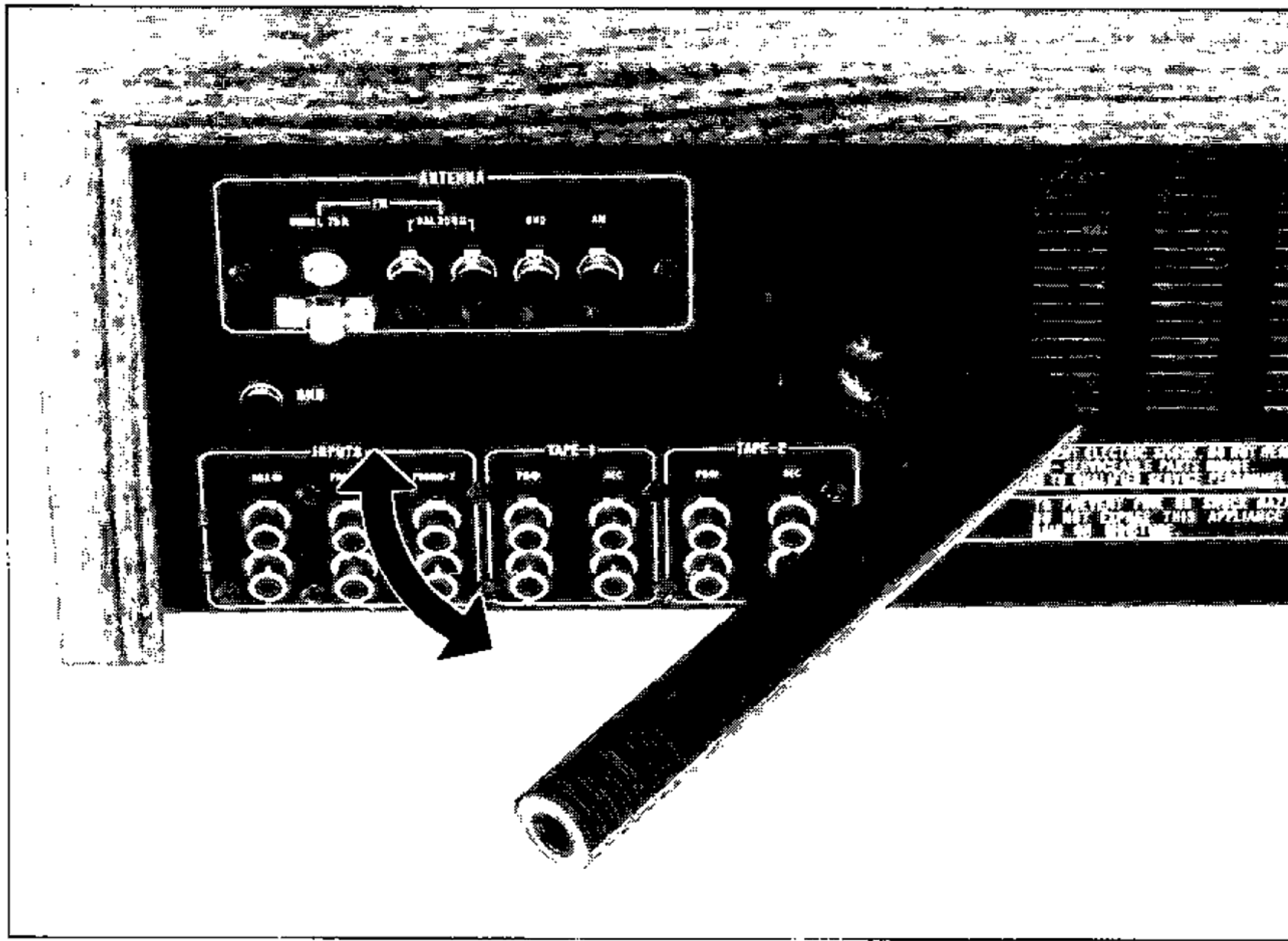
SYSTEM CONNECTION

Refer to the diagram to connect both speakers and program sources.

----- OPTIONAL AUX JACKS CONNECTOR CABLE



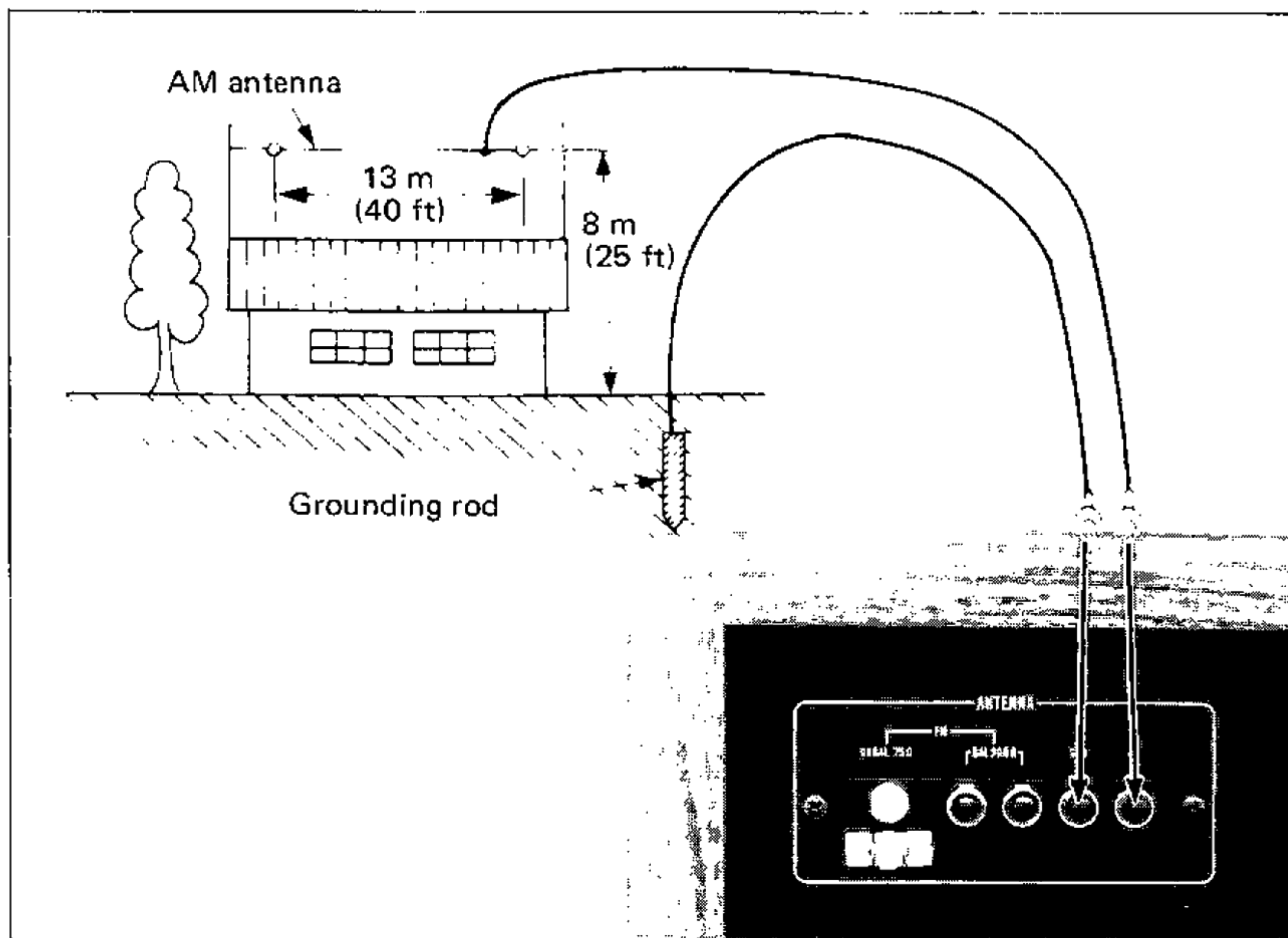
ANTENNA CONNECTION



BUILT-IN AM ANTENNA

The unit is equipped with a highly sensitive ferrite bar AM antenna. It is located on the back panel, and is hinged so that it can be positioned for optimum reception.

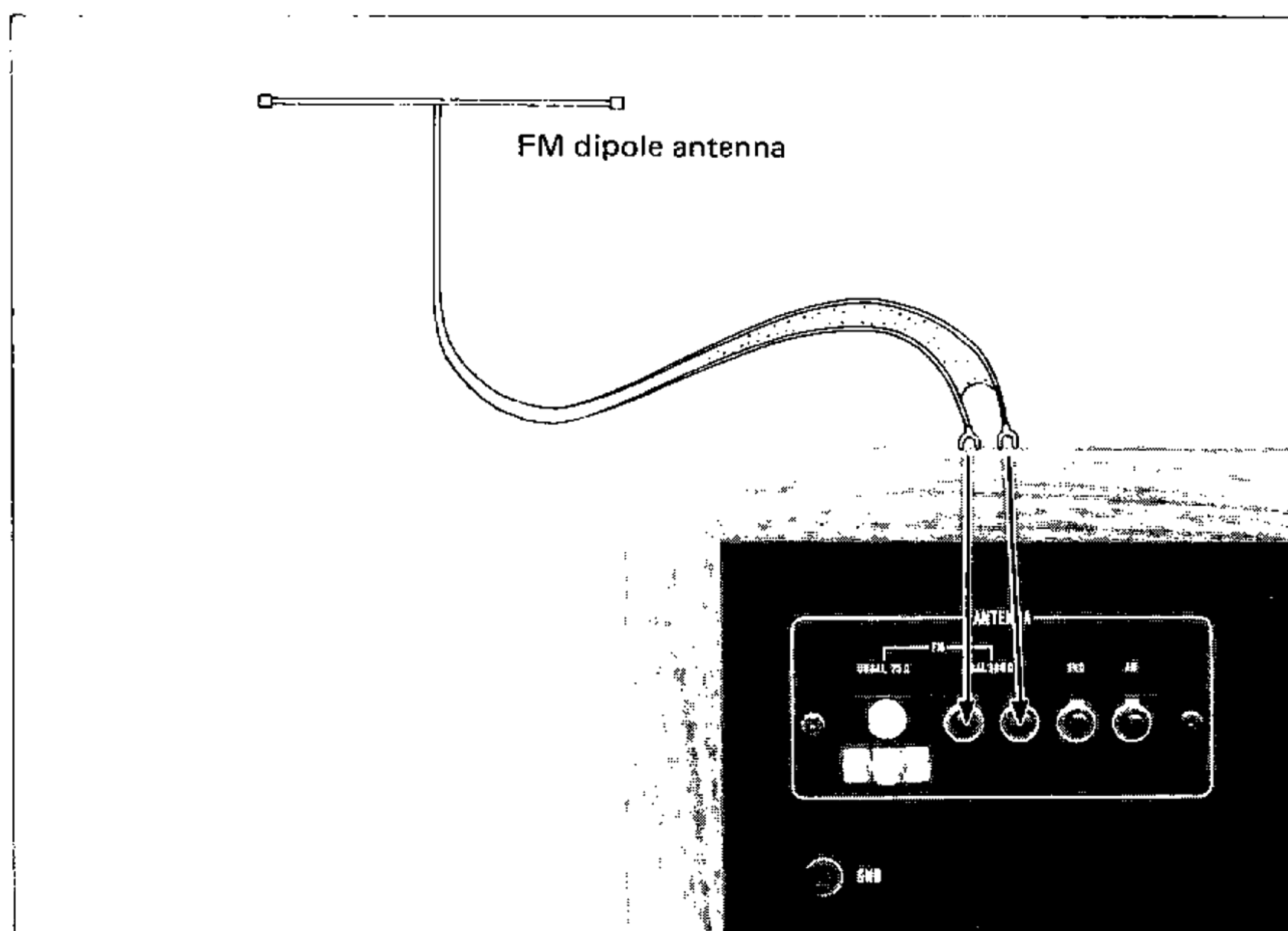
Adjust the antenna as indicated by the arrows for the best signal.



EXTERNAL AM ANTENNA

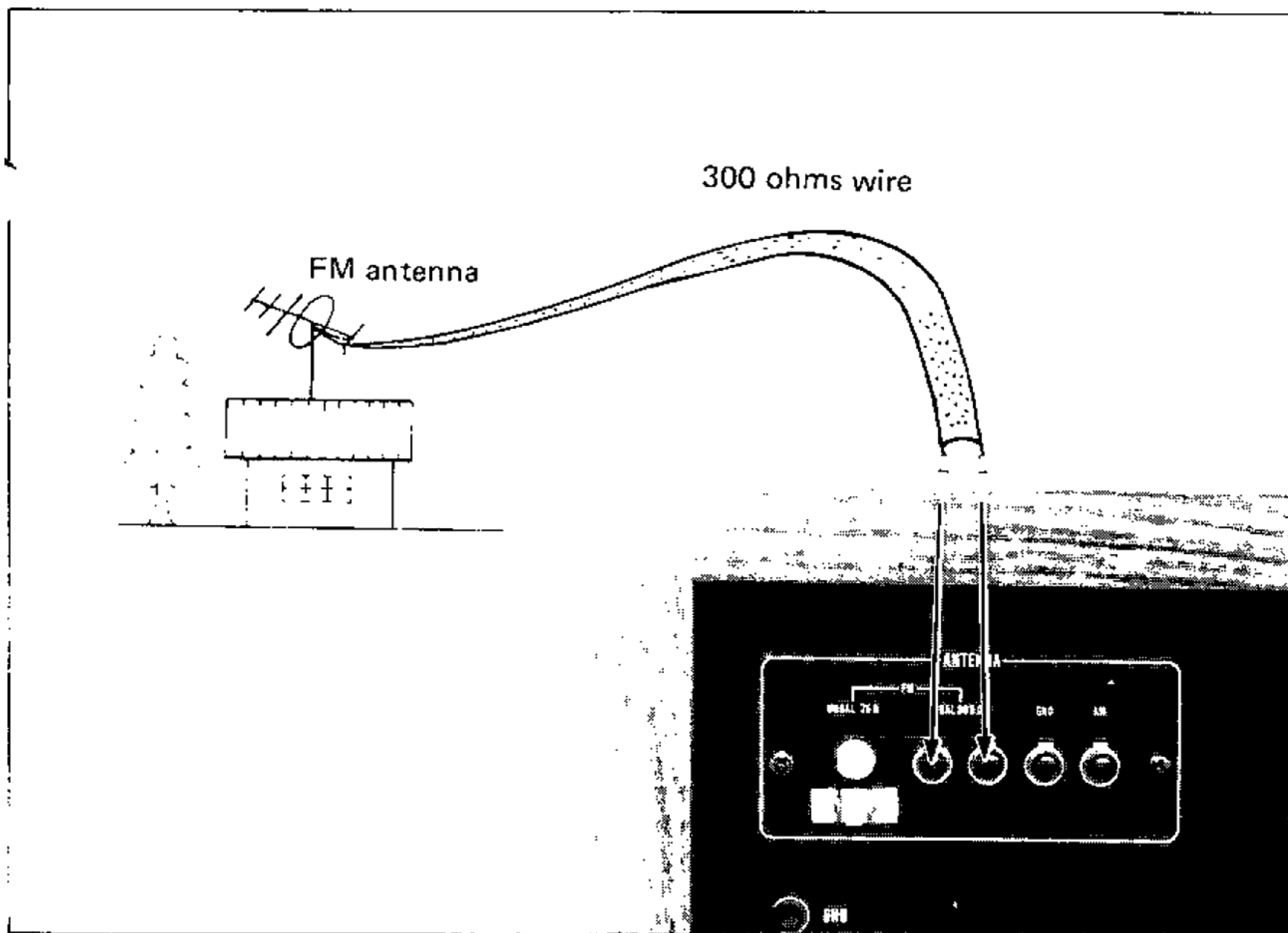
To improve AM reception in remote or fringe areas it may be desirable to install an external AM antenna.

The illustration shows a rooftop installation, but the antenna need not be mounted on a roof as long as it is of the proper length and at the correct height above the ground.



300 OHM FM DIPOLE ANTENNA

Furnished with the unit is a "T-shaped" FM dipole antenna made of 300 ohms wire. This antenna should be adequate in most urban and suburban locations.

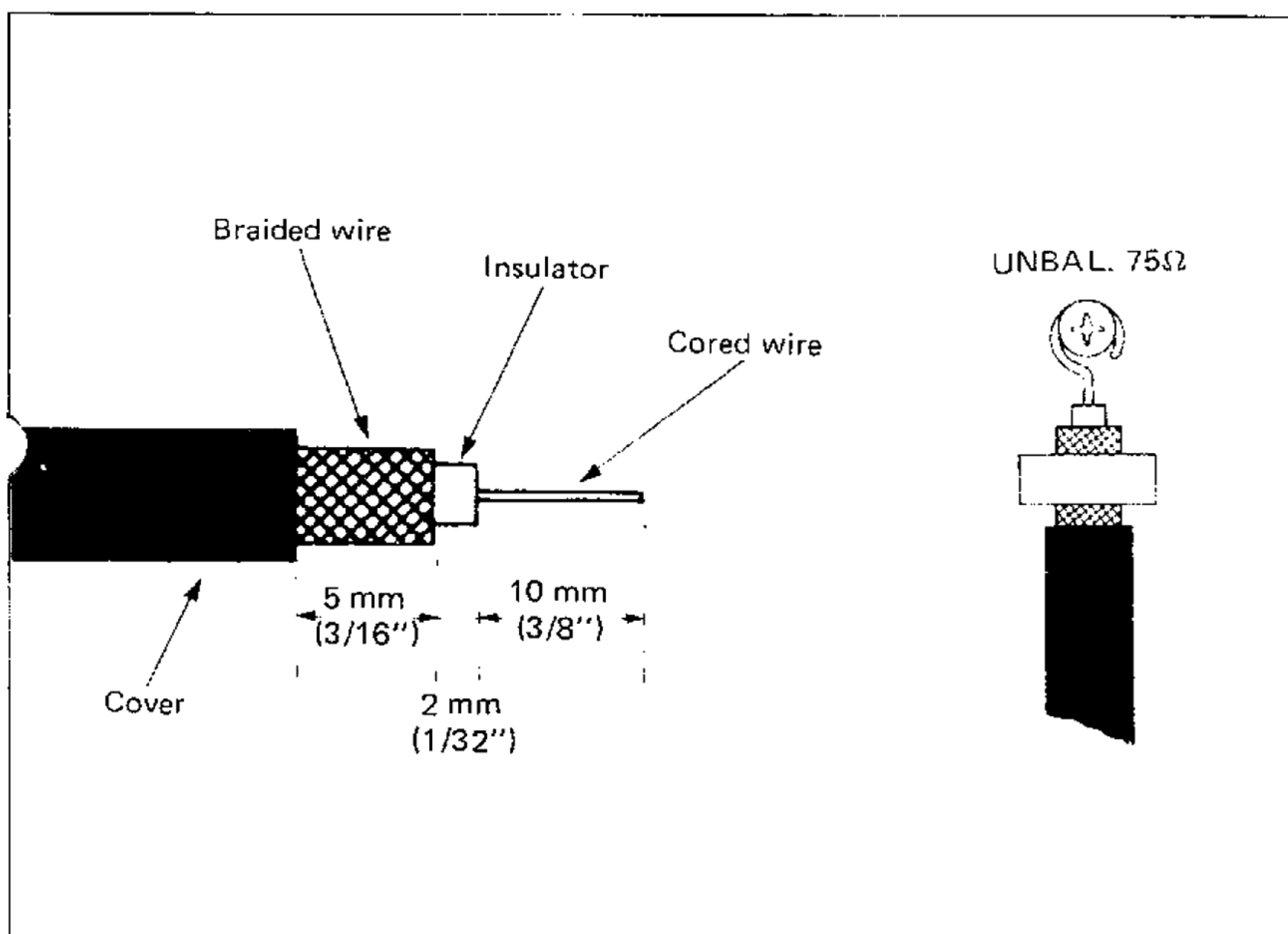


300 OHM EXTERNAL FM ANTENNA

Due to the line-of-sight nature of FM transmissions and the type of terrain at your location or between your location and the transmitter, a noticeable improvement in FM reception may be gained with an external antenna.

The unit has two separate types of FM antenna connection terminals to accommodate both of the popular types of antenna lead-in wire.

To connect the flat, ribbon style wire which has an impedance of 300 ohms, use the terminals marked 300Ω.

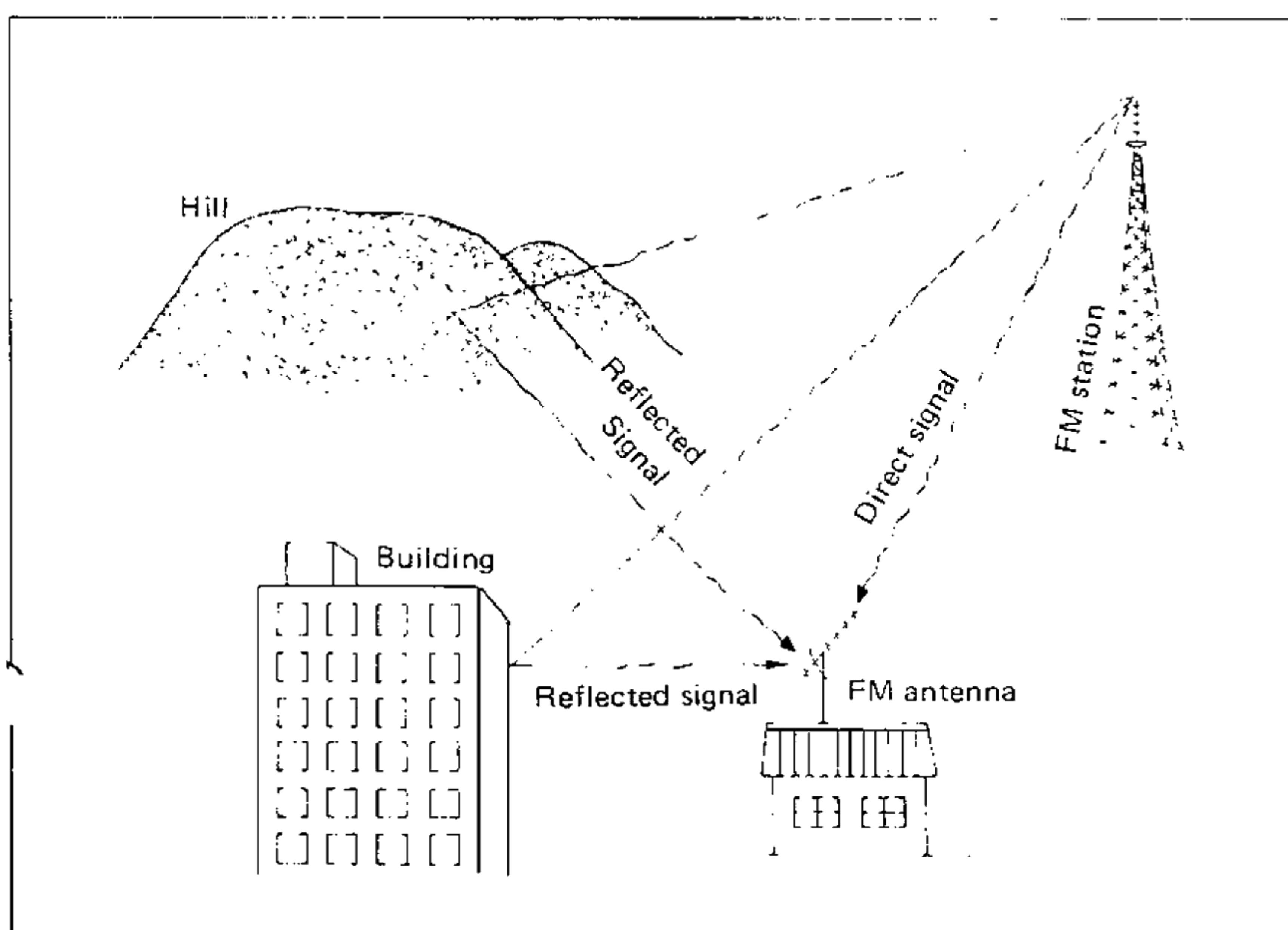


75 OHM EXTERNAL FM ANTENNA

To connect the external antenna to the receiver it is recommended that 75 ohm coaxial cable be used. Its shielded construction resists most types of electrical interference that can cause muddy or noisy reception.

To connect the round, coaxial cable type of antenna lead which has an impedance of 75 ohms, use the terminals marked 75Ω.

Consult your OPTONICA audio dealer for suggestions on the type of antenna best suited for your area.

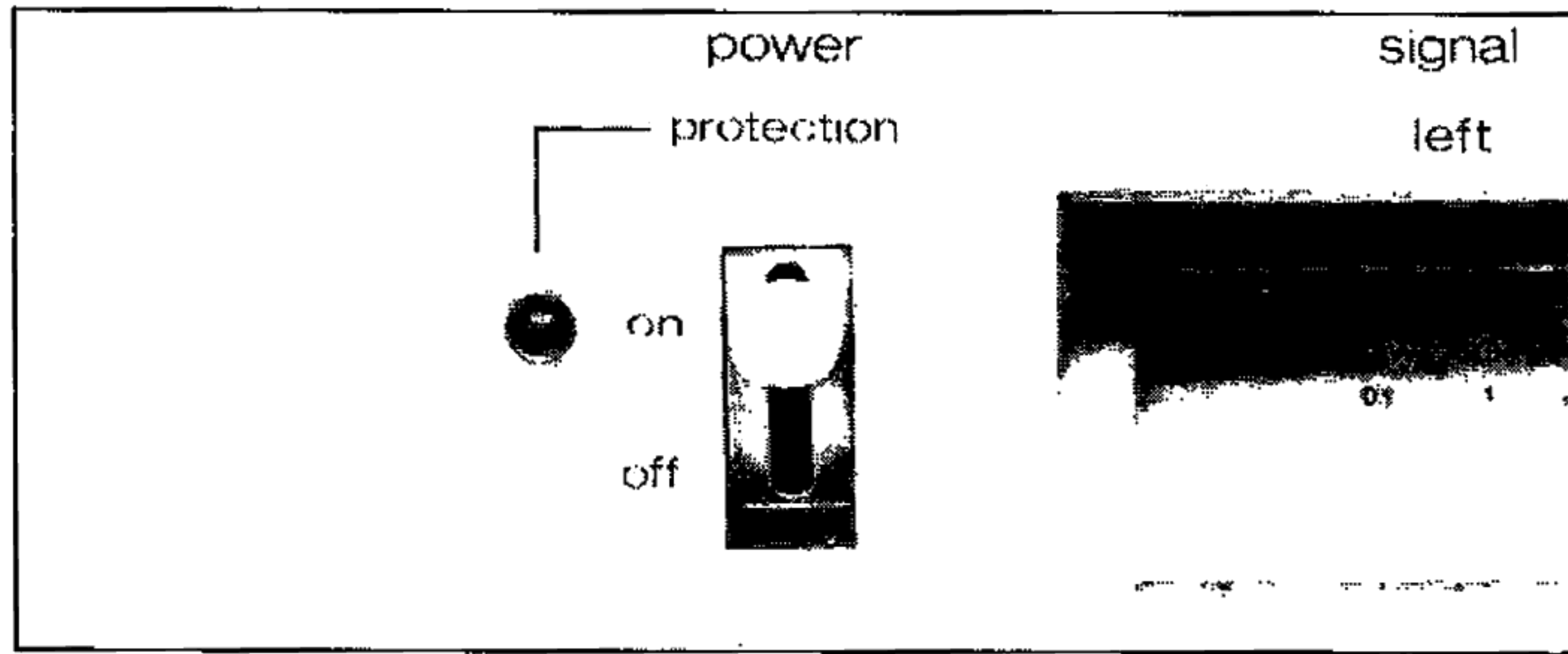


FM MULTIPATH DISTORTION

Multipath distortion is a phenomenon caused by the reflection of FM transmissions from buildings, hills or other large objects. When both the direct signal and the reflected signal are received at the antenna they cause a loss of separation in stereo broadcasts.

Multipath distortion can be decreased or avoided by positioning the antenna properly.

OPERATION

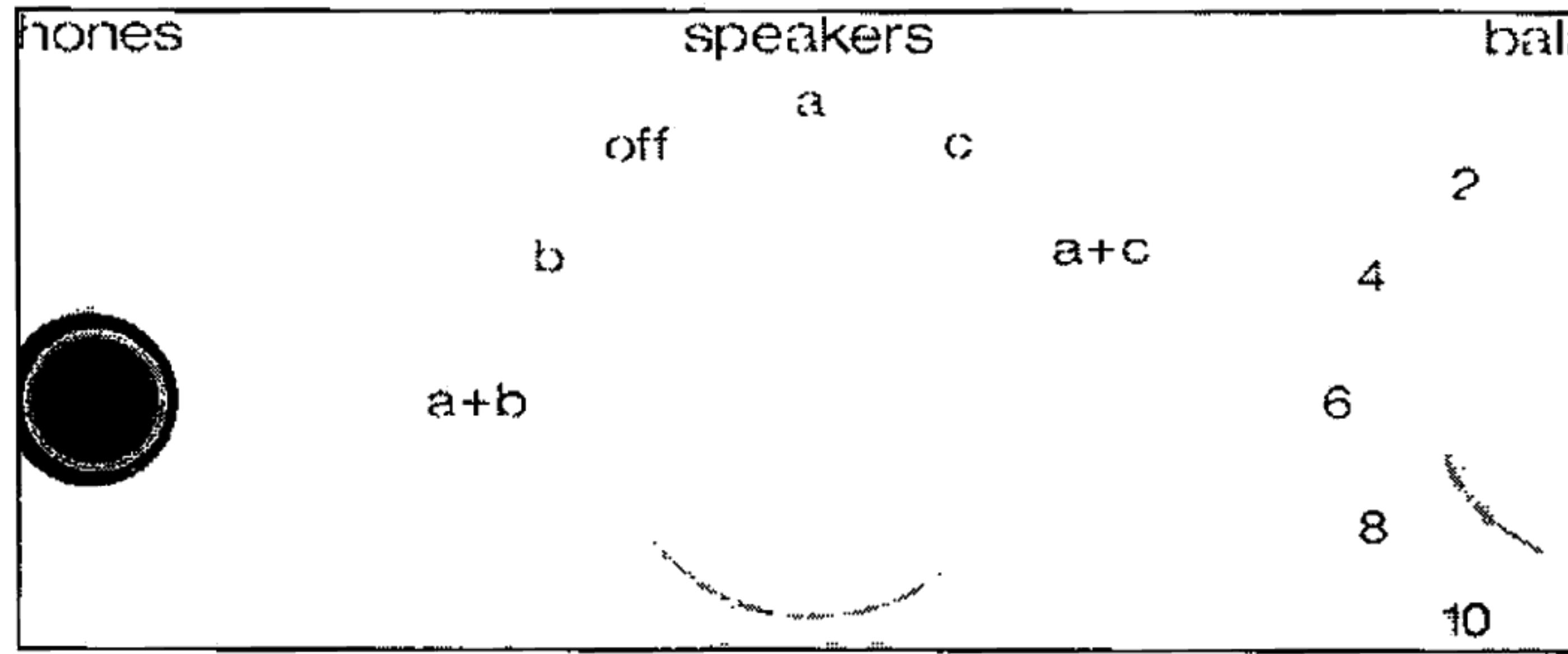


ON/OFF & PROTECTION CIRCUIT

Turn the power switch to the "on" position. A red LED indicator will light up. After about 5 seconds, red LED indicator change to green. Now the amplifier is ready to operate.

The protection circuit automatically cuts out the output stages of the power-amplifier to protect them from overload damage. When this occur, the LED indicator will change to red.

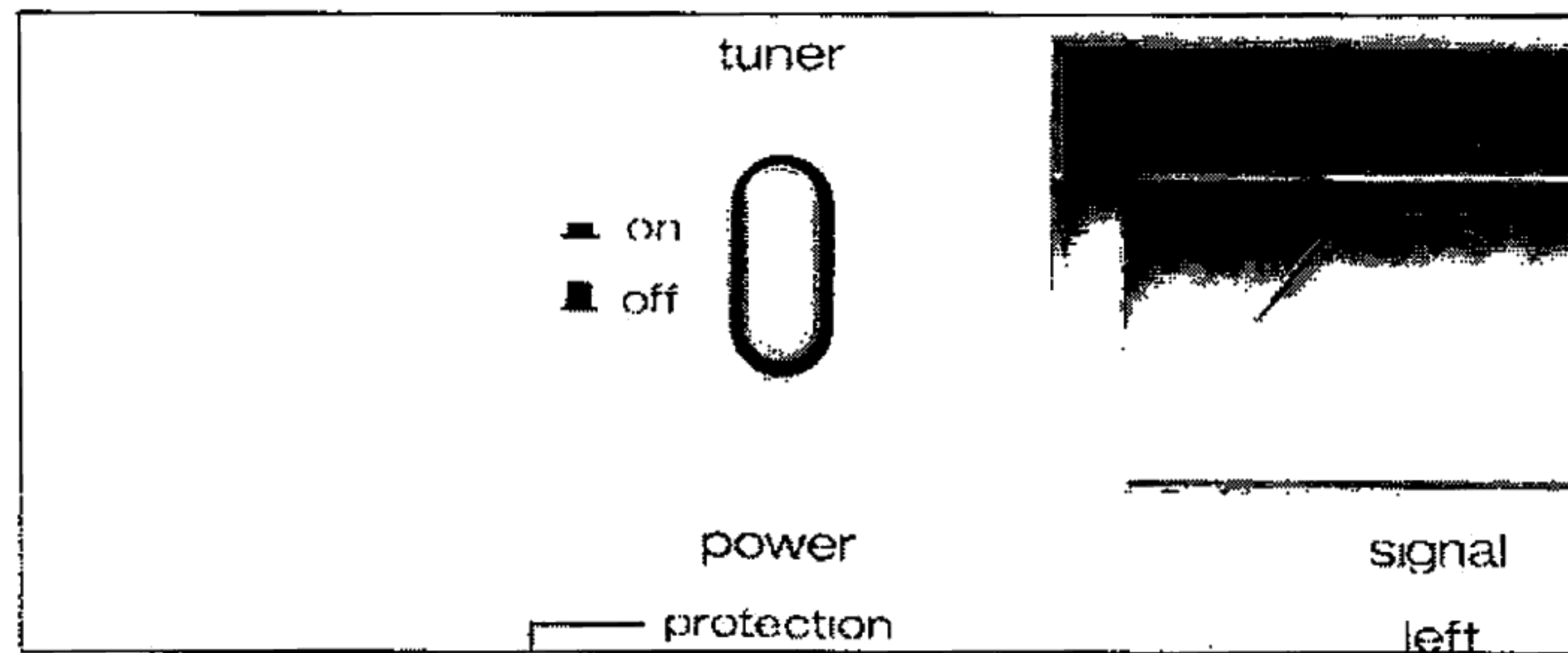
To reset the protection circuit, once set the power switch to "off" and again set it to "on".



SPEAKER SELECTOR

This six-position control allows any one of three pairs of speakers to be chosen individually plus two combination settings.

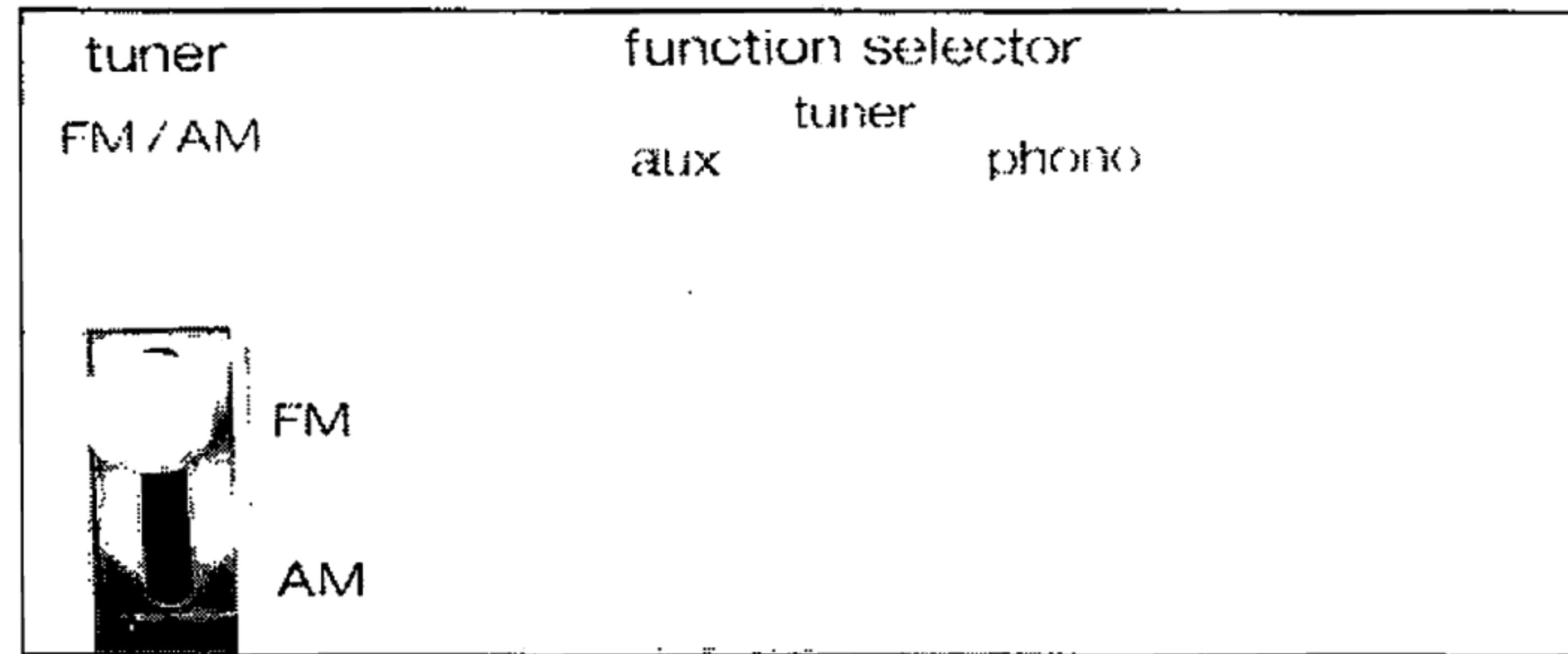
The "off" position is provided for use with headphones to facilitate personal listening at the flip of the selector.



TUNER ON/OFF

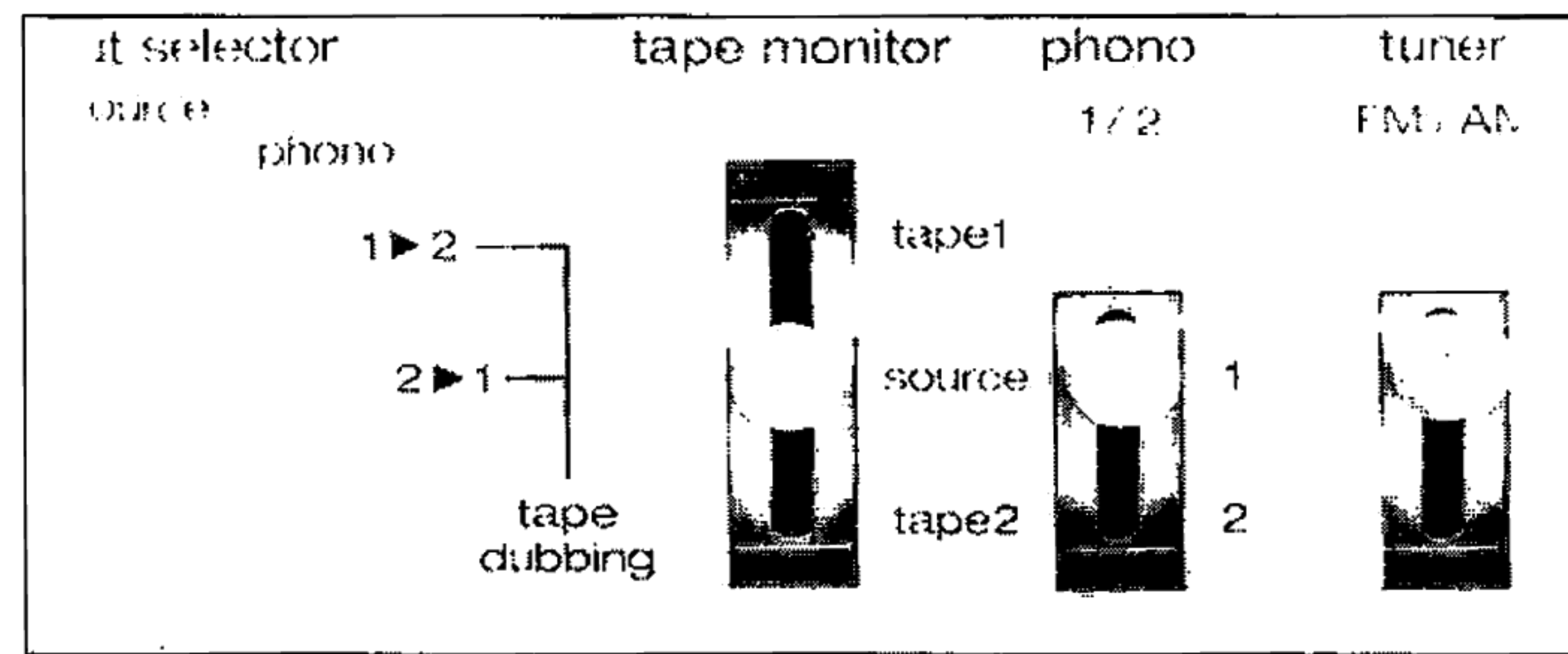
Turn the built-in tuner on/off with this switch. When the tuner is not in use, set the switch to "off" position.

This switch is effective only when the power switch has been set to the "on" position.



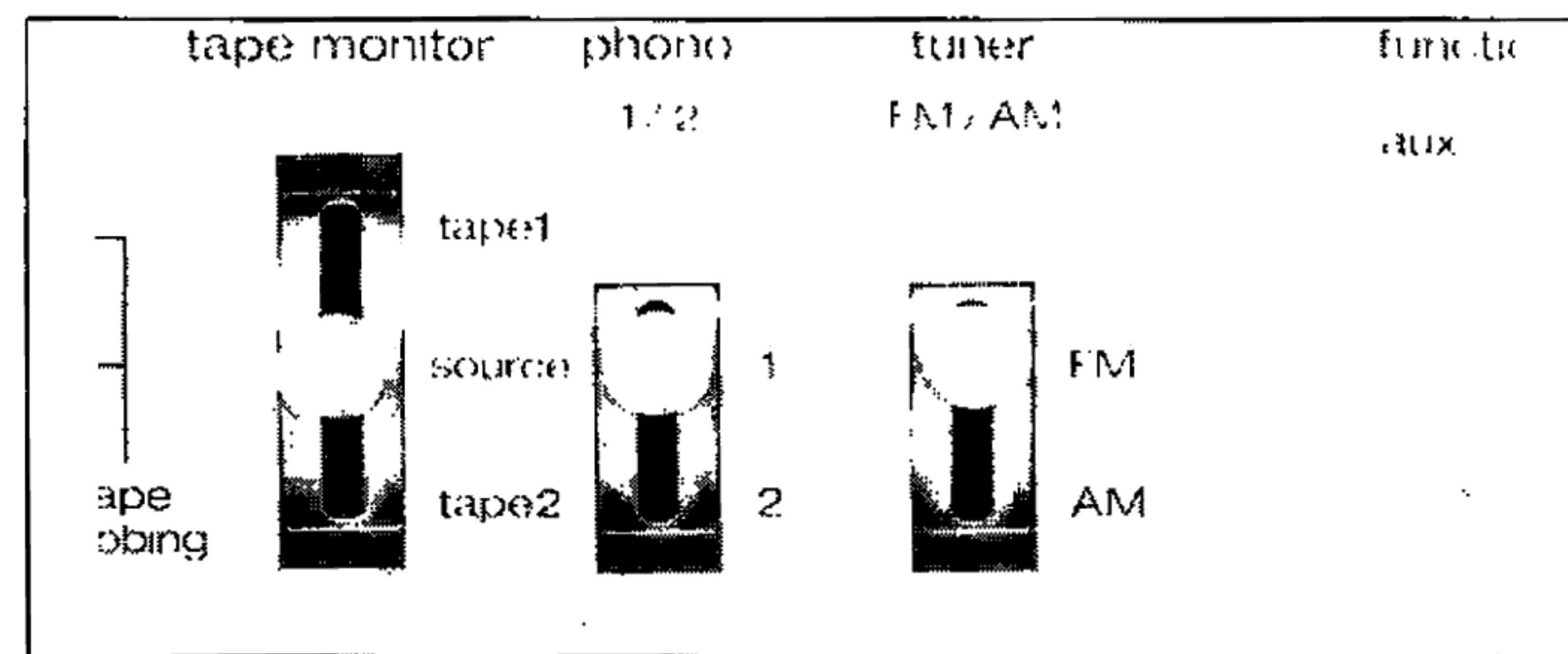
FUNCTION SELECTOR

Program sources, except tape, are selected with this selector.



TAPE MONITOR SELECTOR

This three position control permits instant monitoring of 2 separate tape decks.

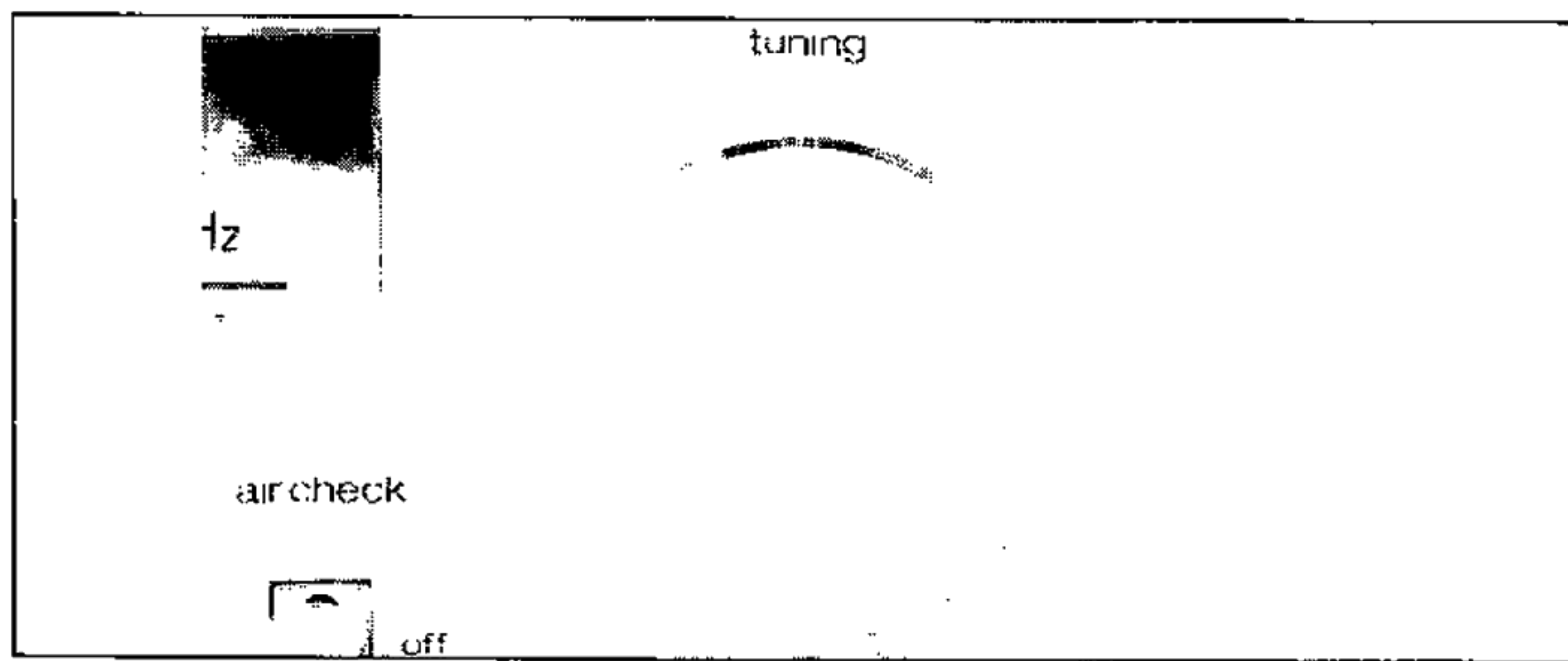


TUNER AM/FM SELECTOR

Set this selector switch to the desired type of broadcast.

PHONO INPUT SELECTOR

Set the phono selector switch to the position corresponding to where you have connected a turntable.

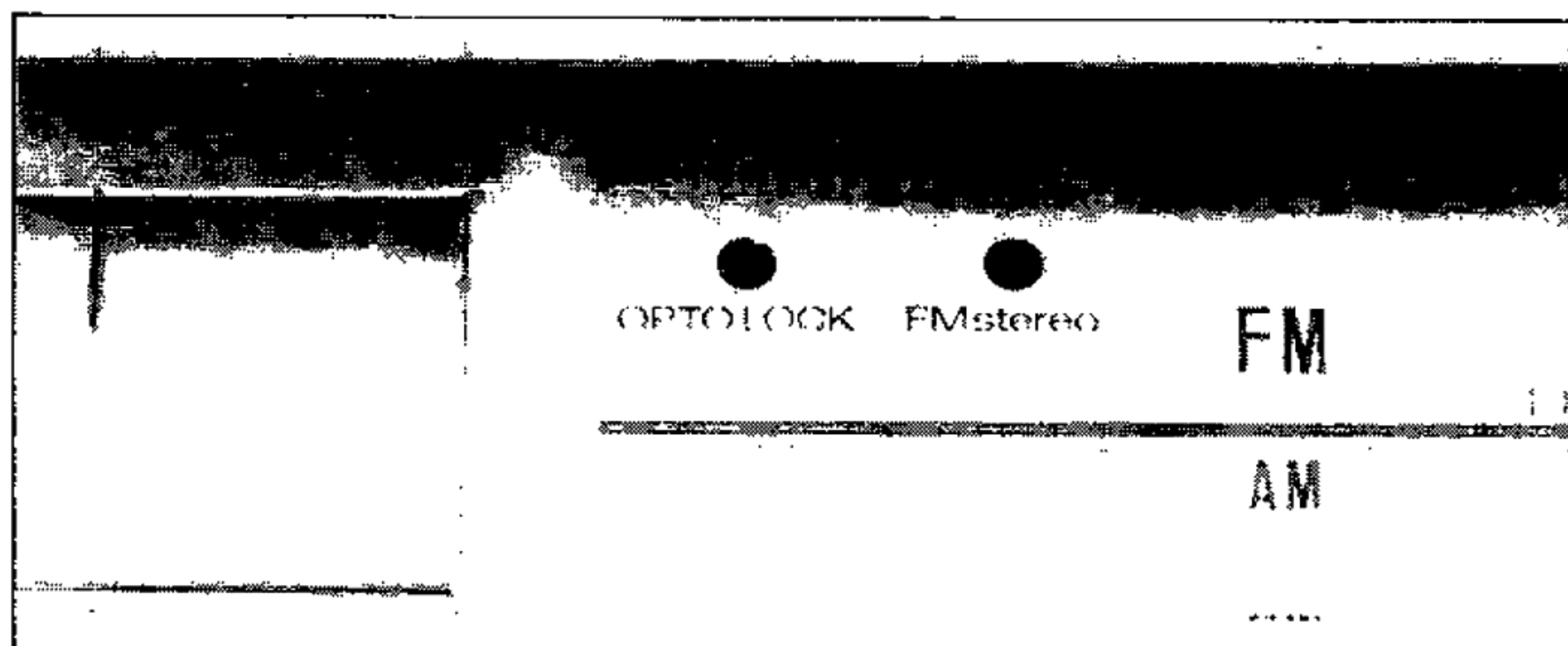


TUNING CONTROL

Select a station by turning the tuning control. The long linear dial scale makes it easy to position the pointer accurately.

Touching your bare hand to the tuning control stops the action of the Opto-Lock circuit automatically.

Releasing the knob puts the Opto-Lock circuit in operation.

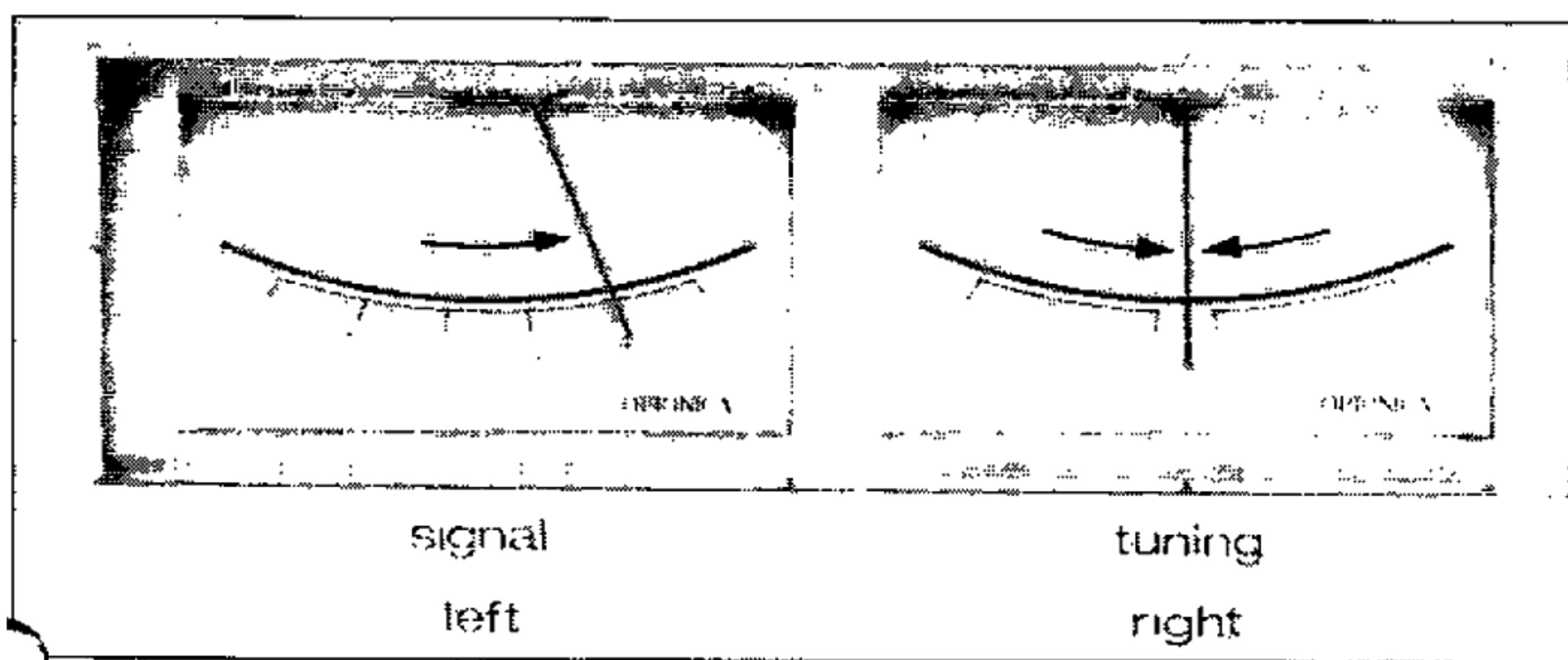


OPTO-LOCK INDICATOR

Lights up when the Opto-Lock circuit is in operation.

FM STEREO INDICATOR

Lights up when an FM stereo broadcast is received.

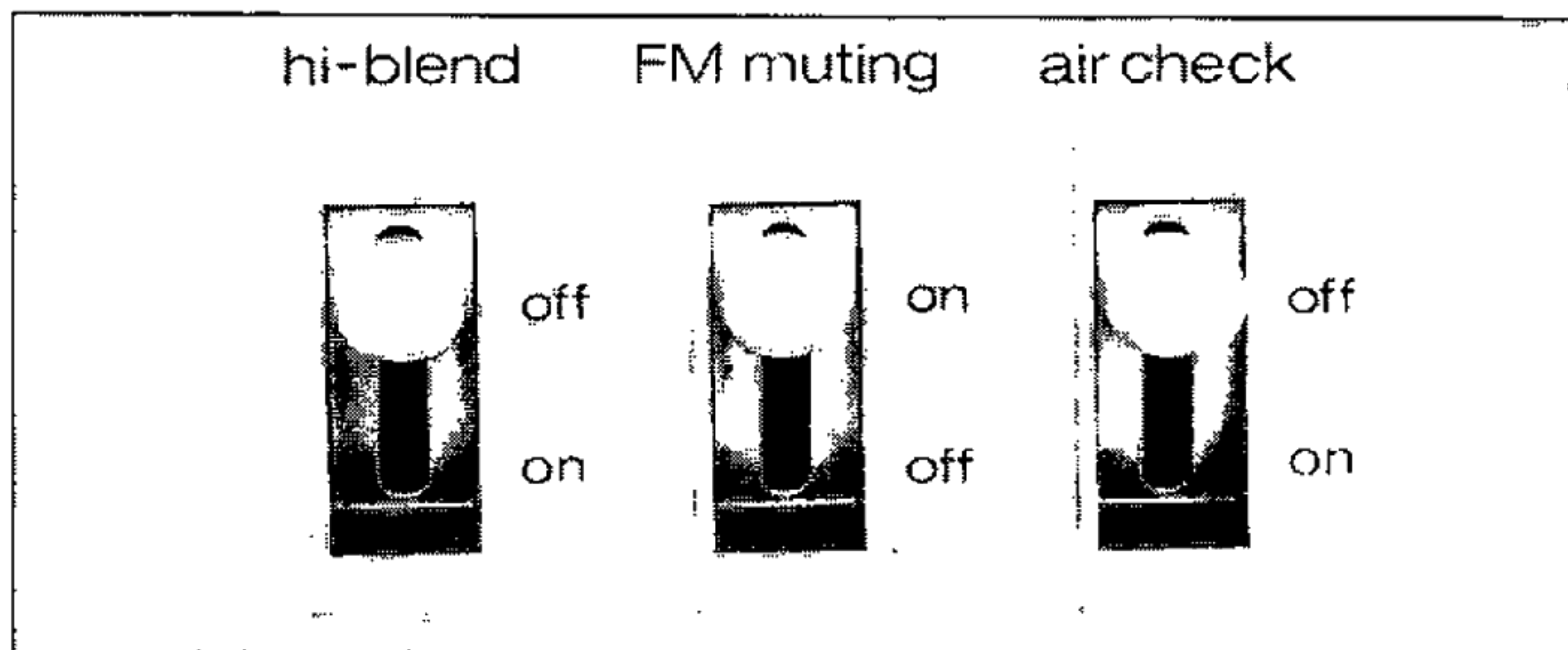


SIGNAL STRENGTH & FM CENTER-STATION METERS

The signal strength meter indicates the strength of the FM or AM signal being received. To tune in a station adjust the tuning control for maximum deflection of the needle, as shown.

The center-station meter will indicate the center or most desirable portion of a received FM signal. The tuning control should be adjusted so that the needle is positioned as in the illustration.

This meter should be used in conjunction with the signal strength meter to tune in the strongest, best quality signal possible.

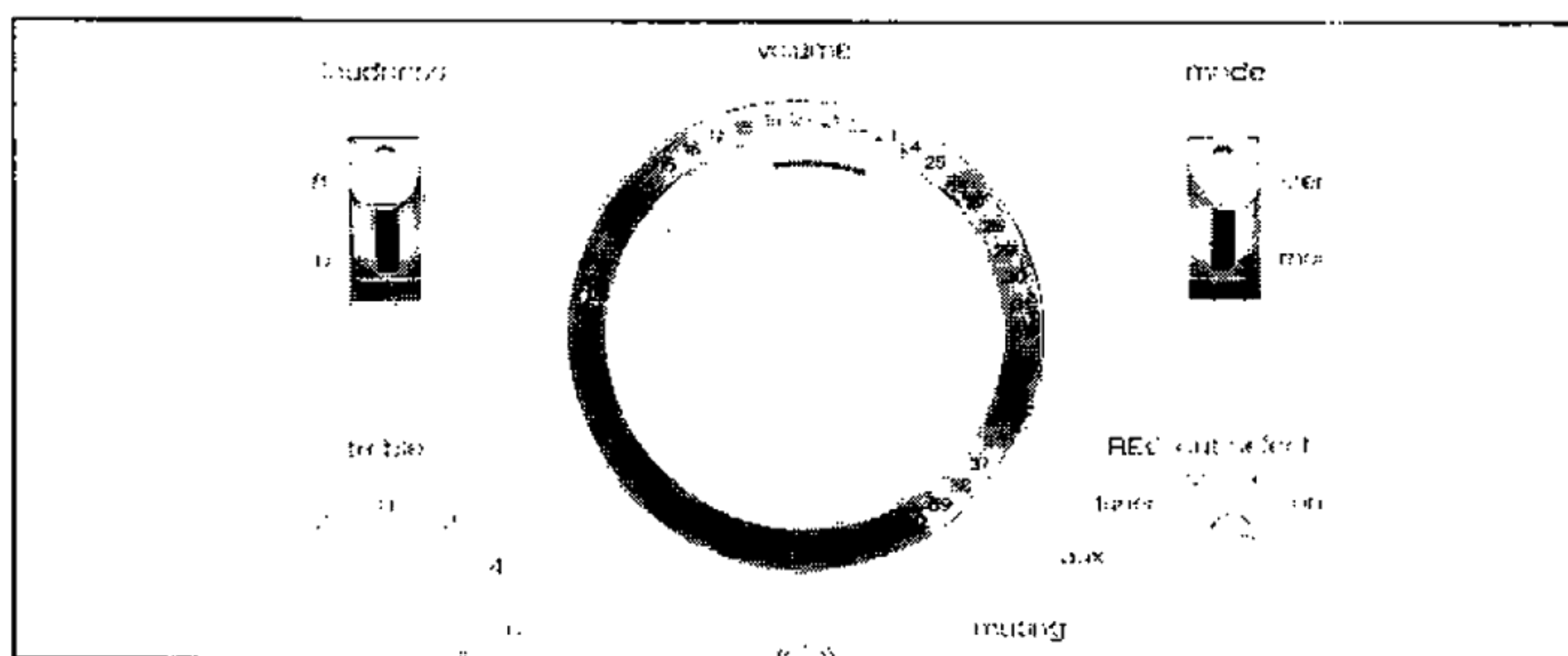


HI-BLEND

The Hi-blend switch effectively reduces high frequency back ground noise on FM stereo. It does not cause a significant loss of separation.

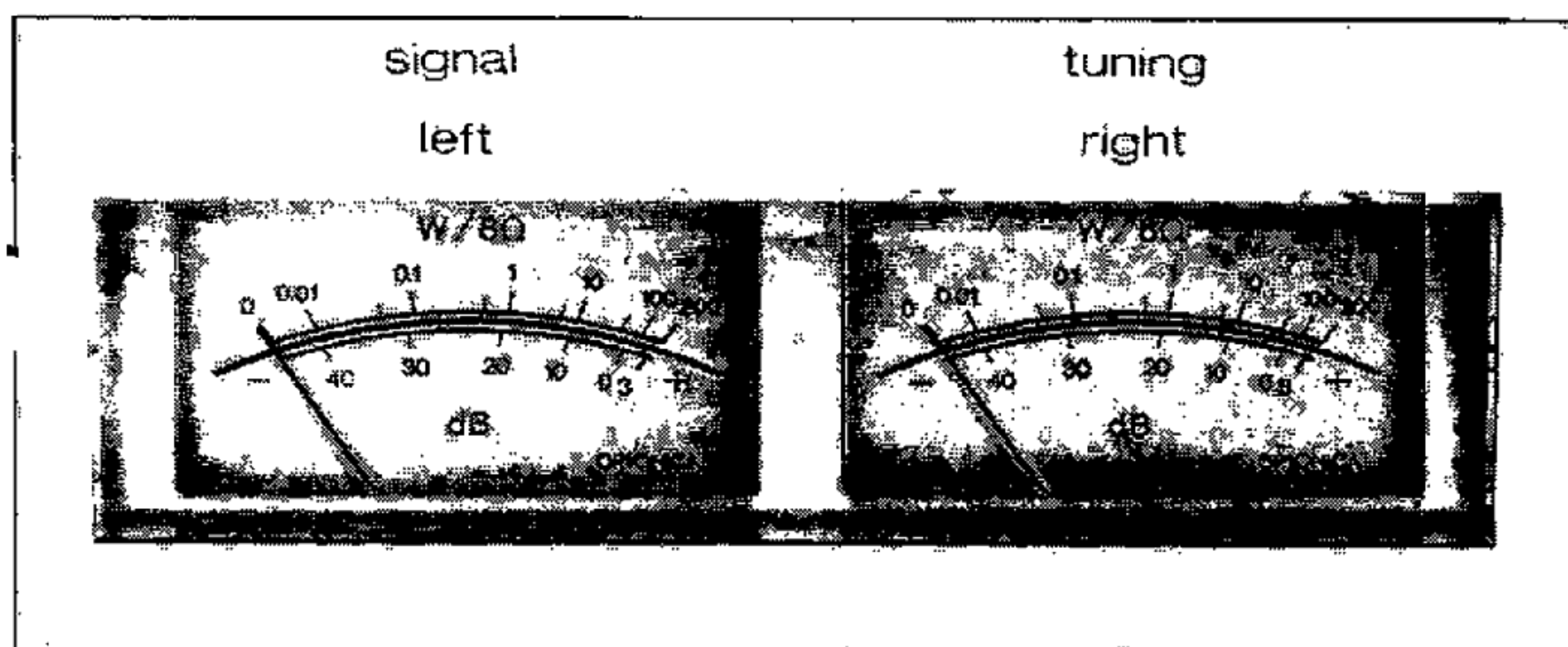
FM MUTING

Set the switch to "on" and annoying interstation noises that are normally heard while tuning are eliminated and the stronger stations are still received clearly. To tune in a weak or very distant station it will probably be necessary to switch off the muting.



VOLUME CONTROL

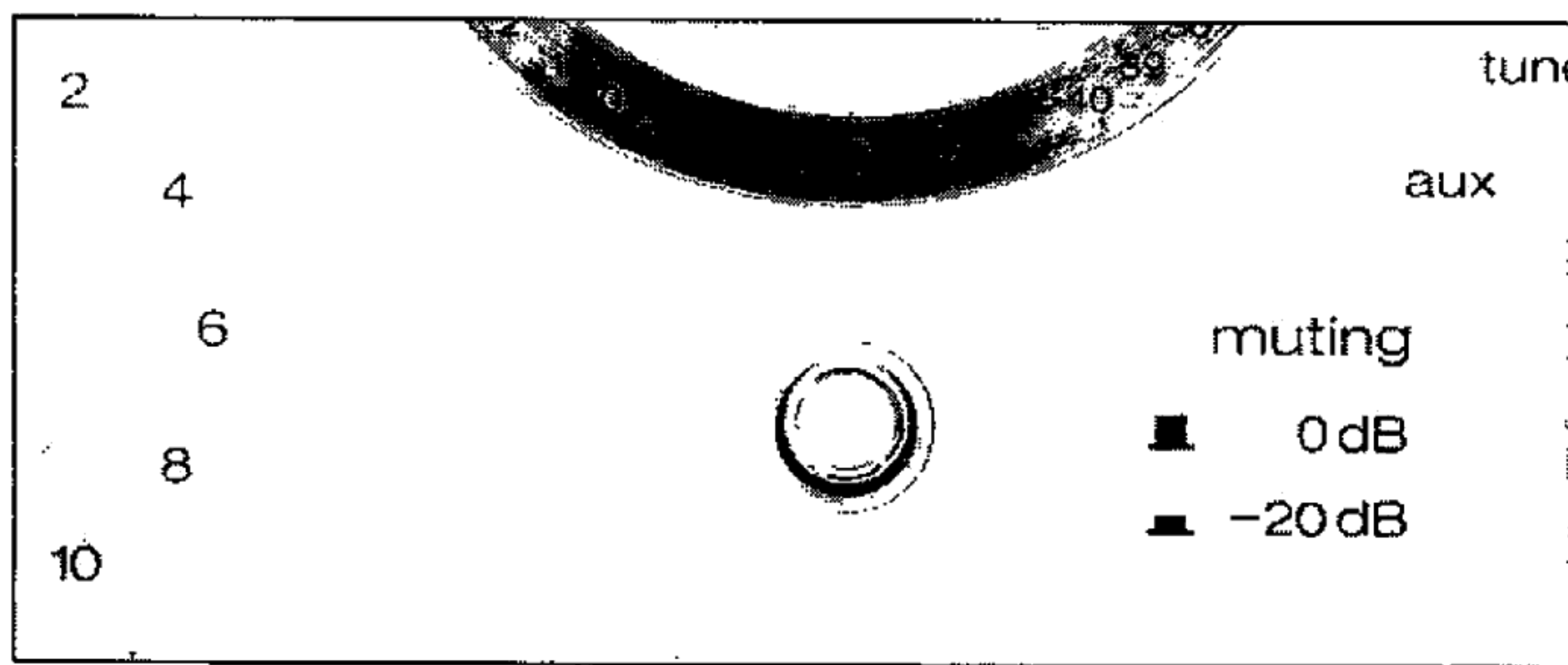
The power being fed to the speakers is adjusted by the volume control. The number scale around the knob provides a reference for duplication of previous settings but does not indicate the amount of power output.



OUTPUT POWER METERS

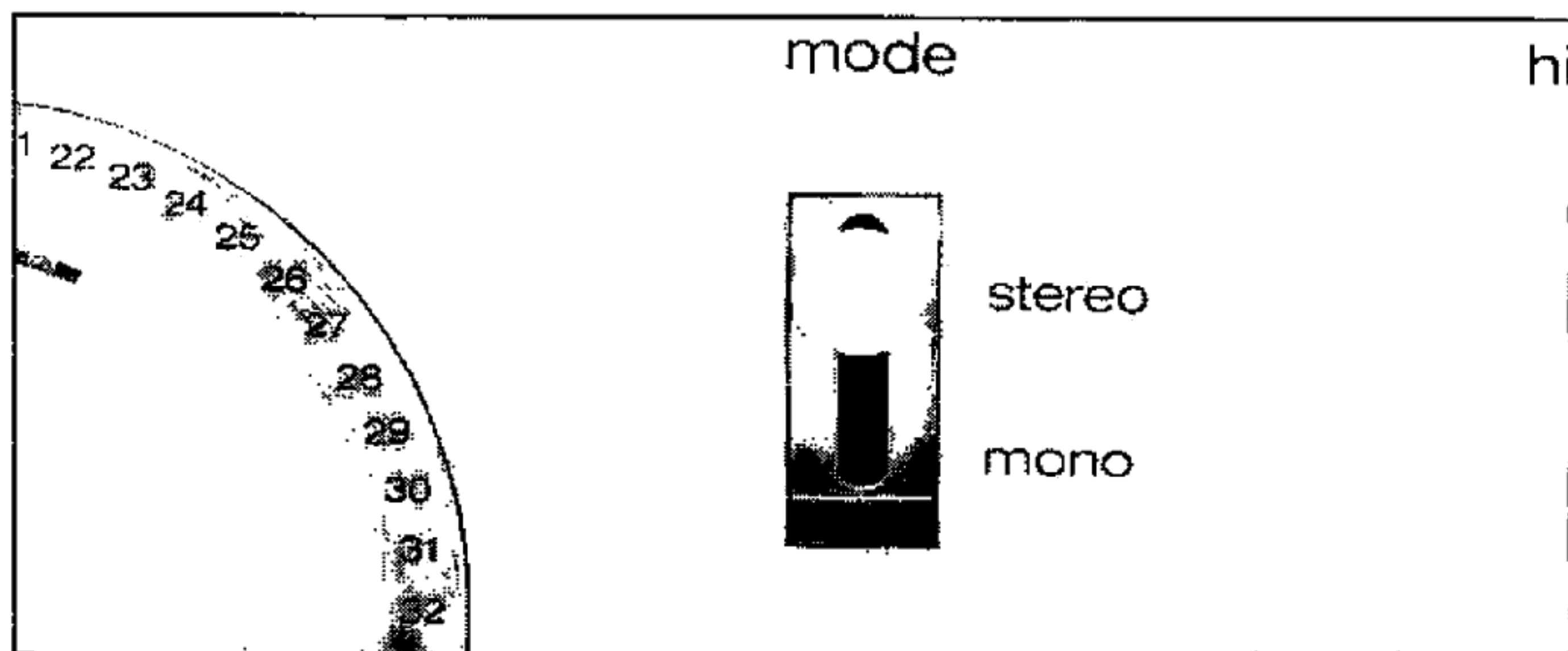
The output meter has two indications; the upper one indicates the power in Watts and the lower one indicates the power in dB.

Adjust the power output by the volume control so that the pointer won't exceed the indication "0 dB" even at the maximum in the case of using an 8 ohms impedance speaker.



AUDIO MUTING

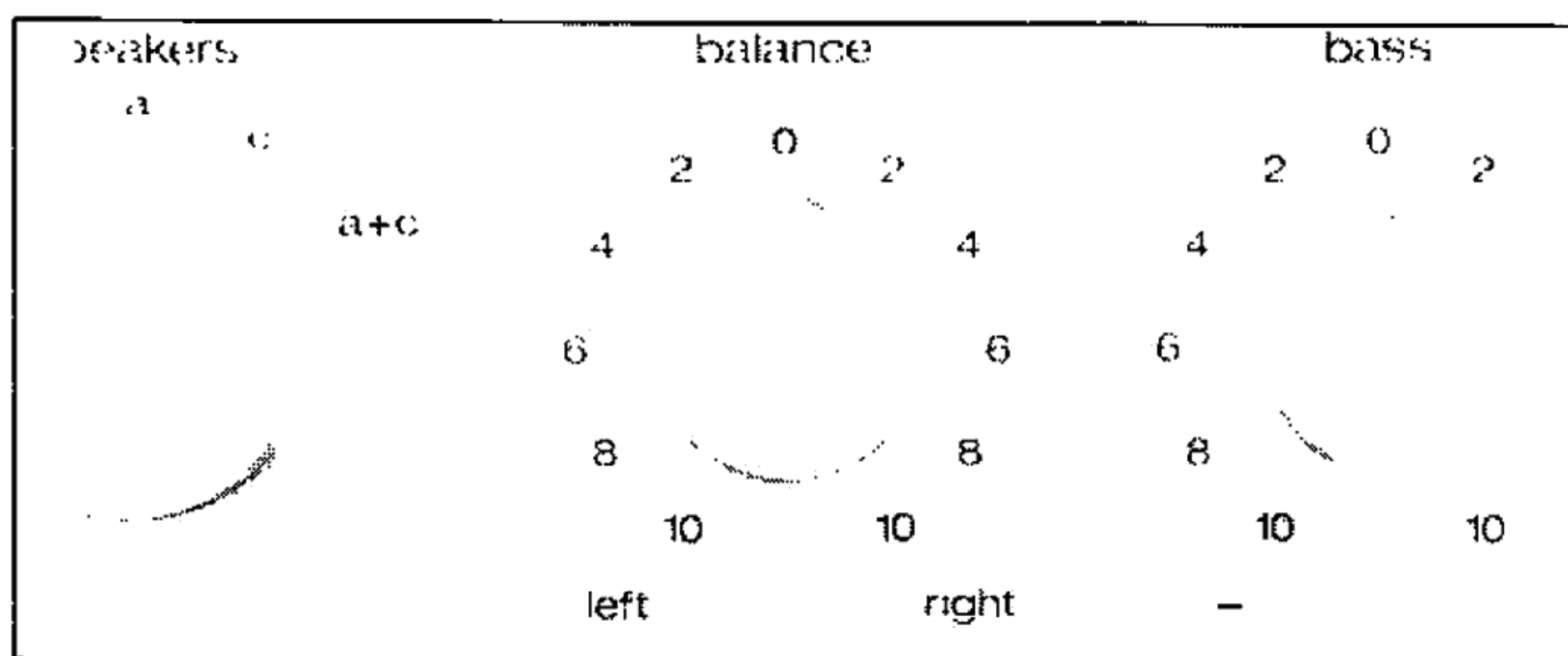
When switched to the “-20 dB” position the muting circuit decreases the output by 20 decibels. When switched to the “0” position the volume is restored to the previous level.



MODE SELECTOR

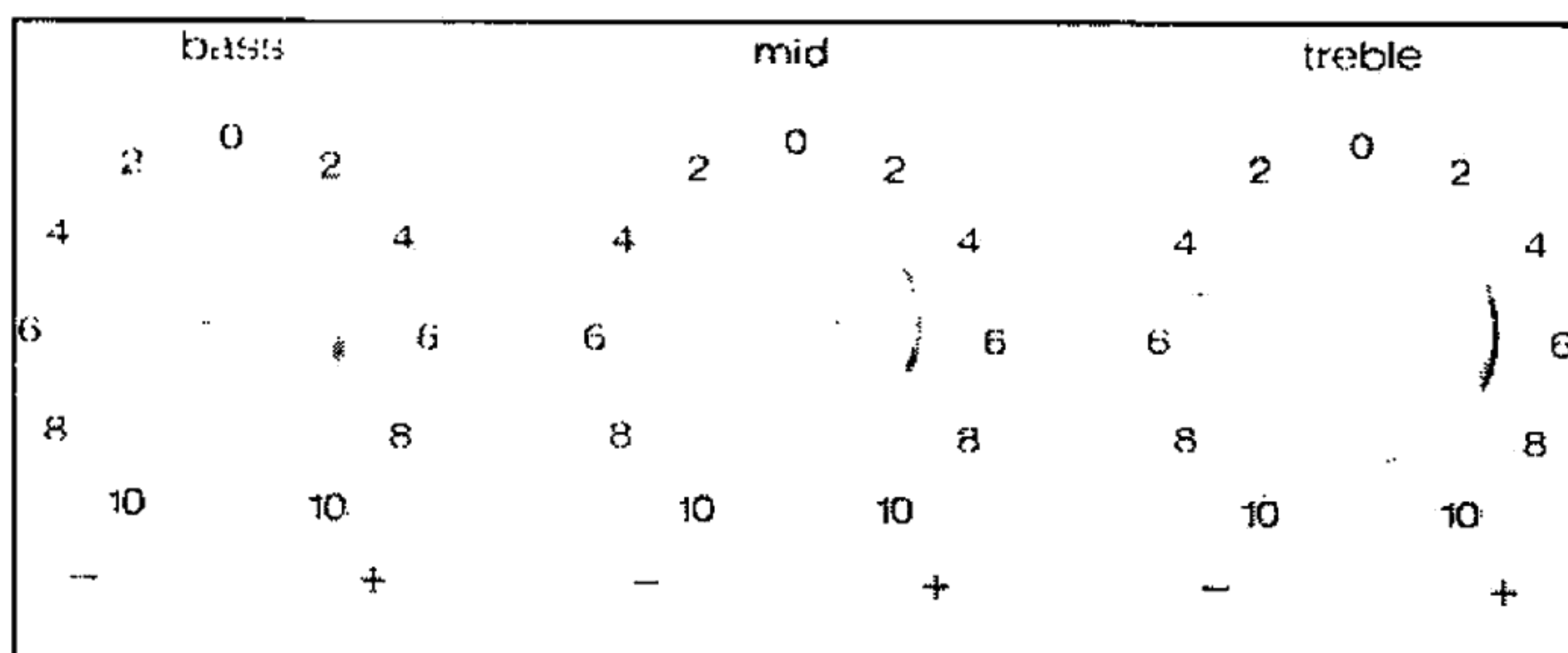
Change the mode of reproduction with this control. Choose between normal stereo, or left plus right channel monophonic.

The “mono” position may be used to listen to a very weak, hard to receive FM stereo station. Reception will not be stereo but may be improved enough to permit comfortable listening.



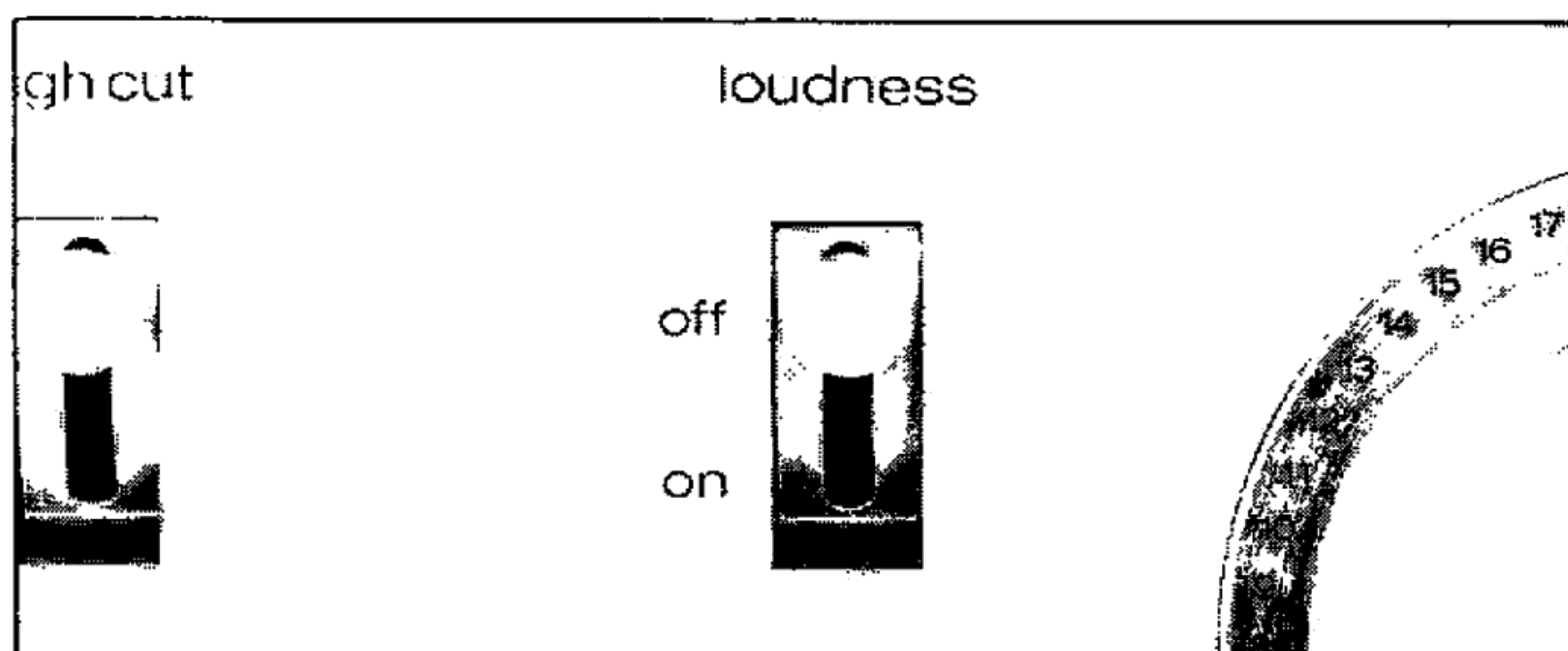
BALANCE CONTROL

Rotating the control shifts the volume balance from equal amounts at both channels to greater volume on one side and less on the other side. It is particularly useful for adjusting the reproduction when the listening position is closer to one speaker than to the other.



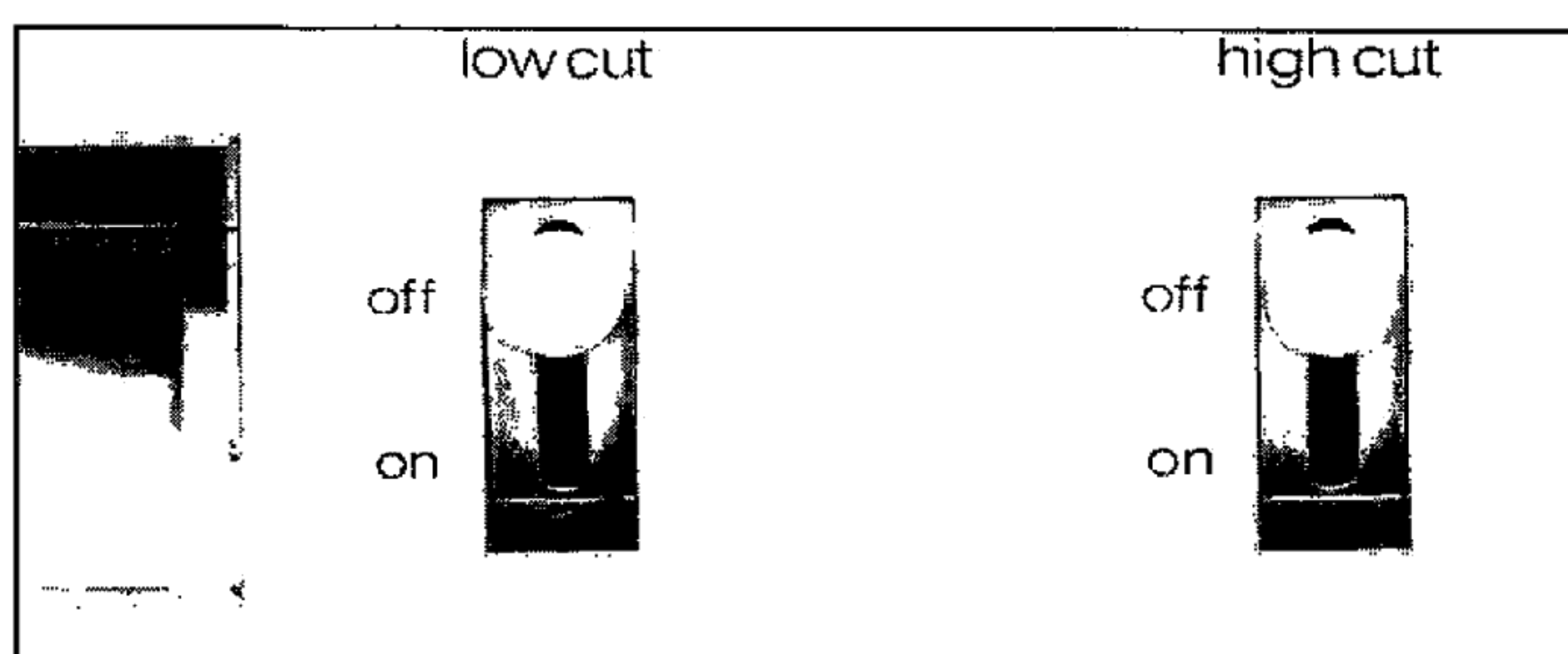
BASS, MID, & TREBLE CONTROLS

Separate controls permit a wide variety of tone shading. This allows the reproduced sound to be adjusted to personal taste and room acoustics.



LOUDNESS CONTOUR

Use this control to reinforce the bass and treble reproduction at low volume levels. It compensates for the loss of bass and treble when listening at background volume levels but should be switched off when listening at normal levels.

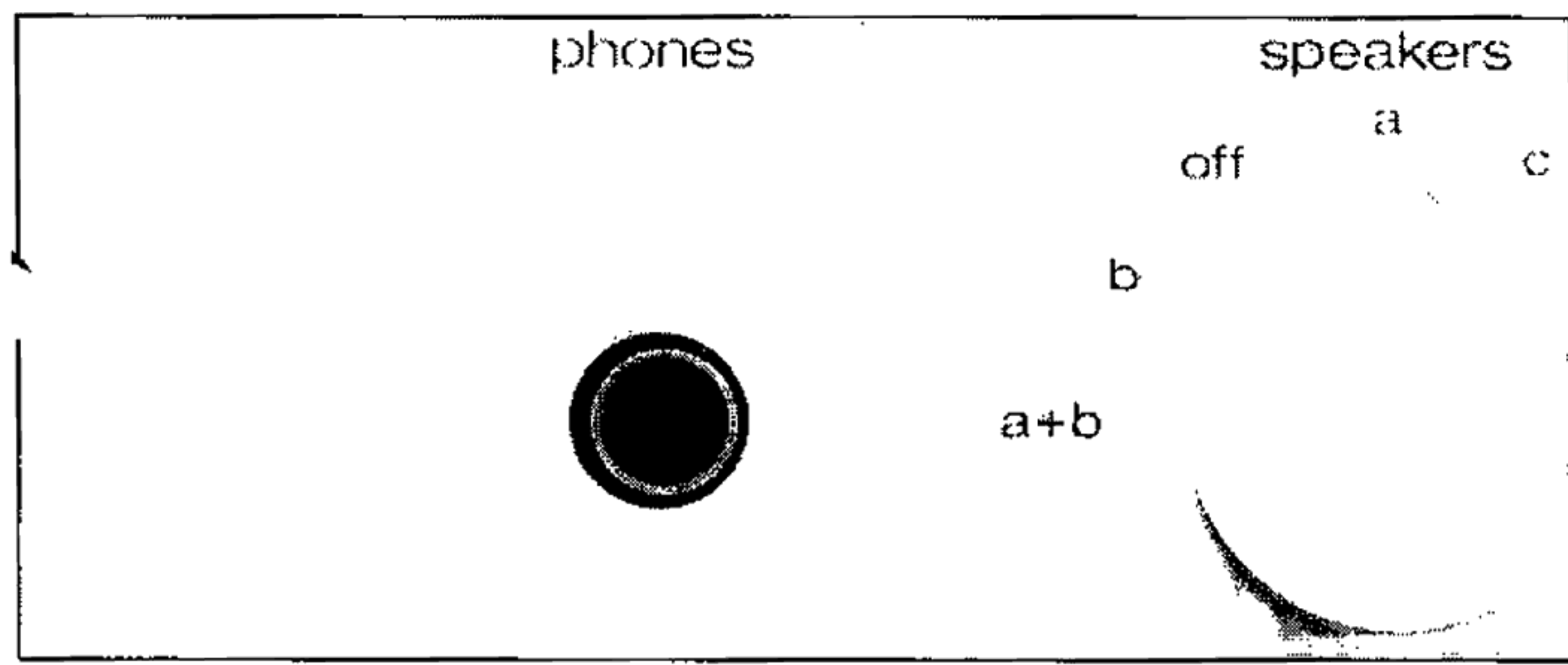


HIGH & LOW FILTERS

This pair of controls sharply cuts off the frequency response at their respective ends of the spectrum.

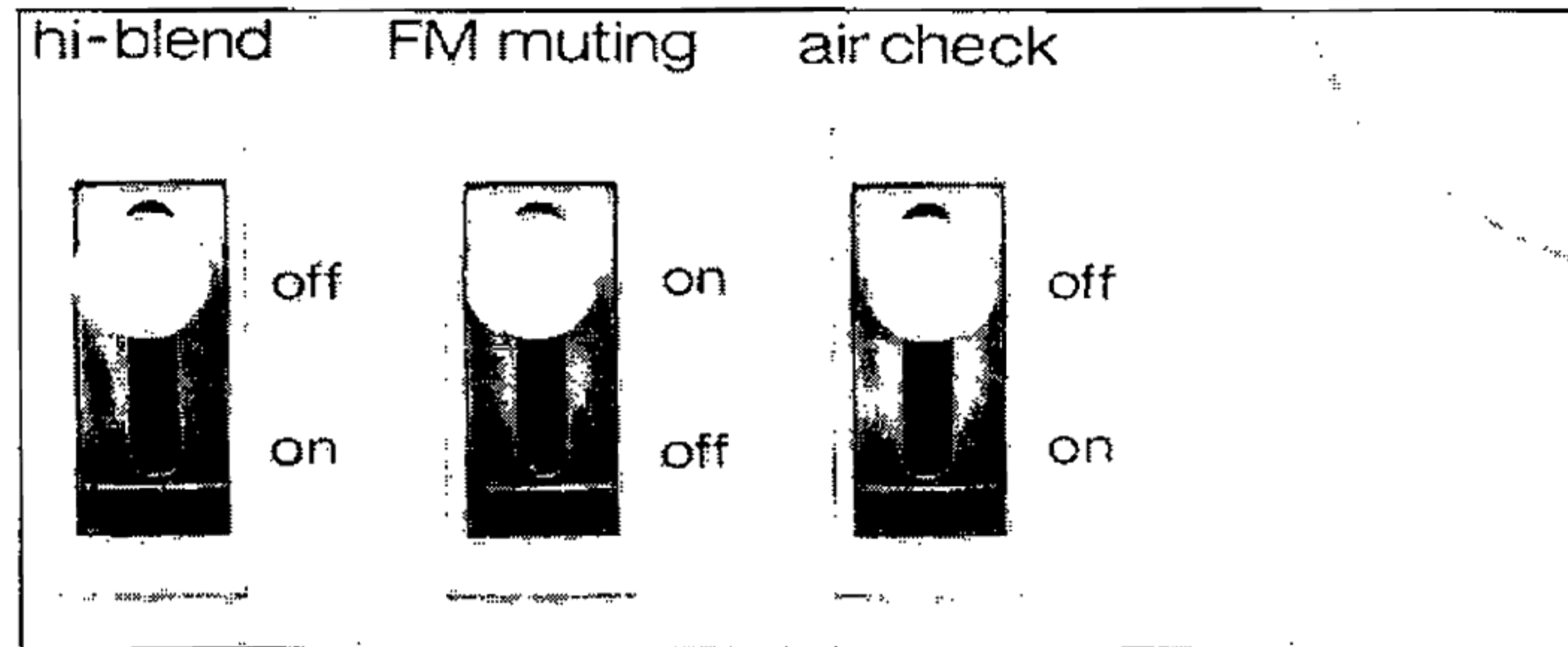
Use the high filter to eliminate tape hiss, surface noise from old or worn discs and any annoying electrical noises. The low filter cuts out rumble noises from motors or warped discs.

Both filters should be left in the “off” position when not need because of their frequency response limiting characteristics.



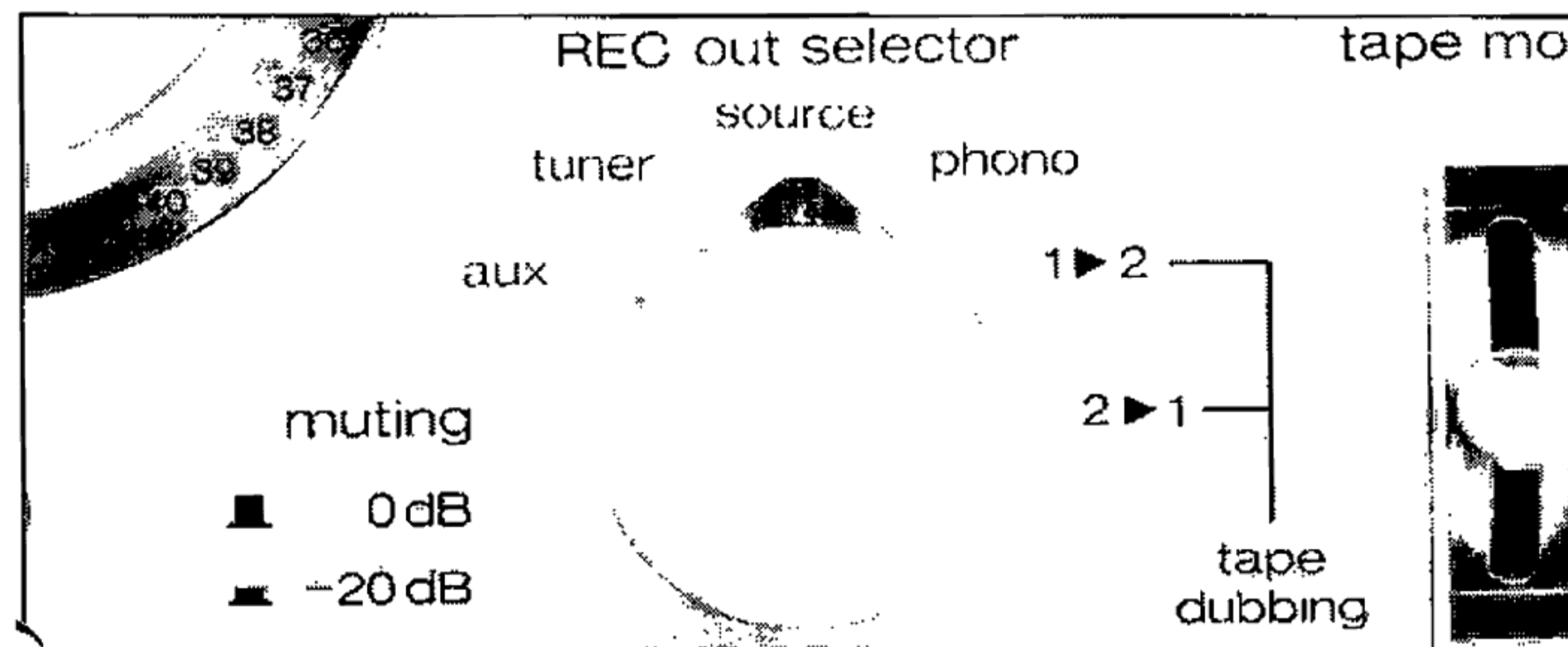
HEADPHONES JACK

The front mounted 8 ohms headphone jack accepts all standard headphones and is perfect for personal listening and critical monitoring of programs that are being taped. The speaker selector may be set to the "off" position for personal listening. The volume level can be adjusted by the volume control.



AIR CHECK CALIBRATOR

Use the air check switch to adjust the recording level of a tape deck when preparing to tape FM broadcasts. With this switch in the "on" position, a 400 Hz tone generated in the tuner is fed to the tape deck so the VU meters can be calibrated.



RECORDING OUTPUT SELECTOR & TAPE DUBBING SELECTION

Any program source that you are actually listening to or another source which are not listening to can be independently recorded into the tape deck.

Aux The signals from the AUX jack are fed to the REC jacks 1 and 2.

Tuner The signals from built-in tuner are fed to the REC jacks 1 and 2. Switch the tuner FM/AM selector to the desired position.

Source The program you are listening, e.i., the same as the signals from the speaker, is fed to the REC jacks 1 and 2.

Phono The signals from the turntable 1 or 2 are fed to the REC jacks 1 and 2. Switch the phono selector to the desired position.

Tape dubbing from either tape deck - in either direction - is possible by simply selecting the appropriate setting.

Tape dubbing 1 ► 2 When recording a program from tape deck 1 to tape deck 2.

Tape dubbing 2 ► 1 When recording a program from tape deck 2 to tape deck 1.

TROUBLE SHOOTING CHART

If you encounter a problem while operating your receiver, consult the chart below.

You will usually find a quick solution to most problems in the chart.

If the recommended action does not correct the problem, please contact your local OPTONICA service center.

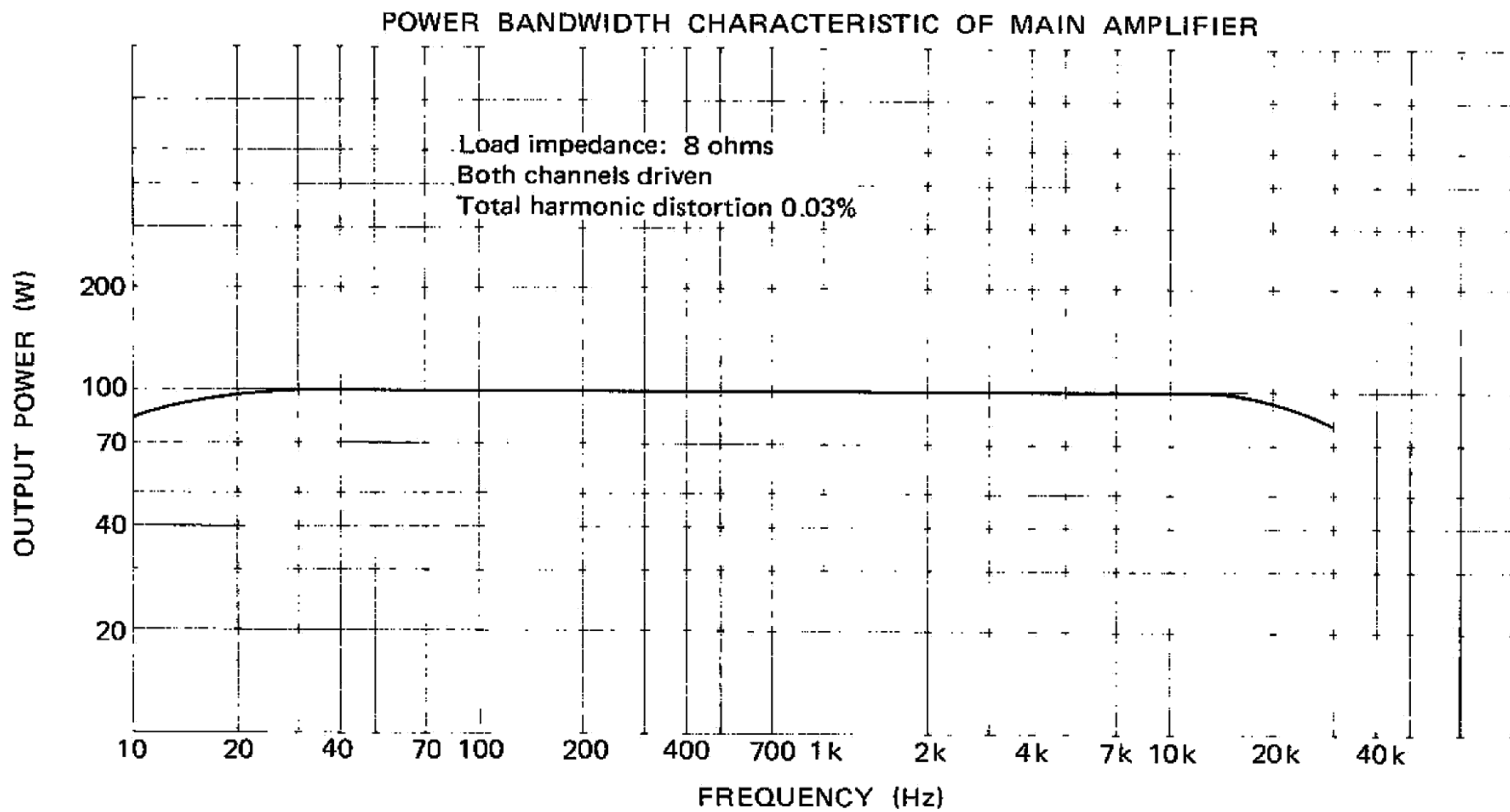
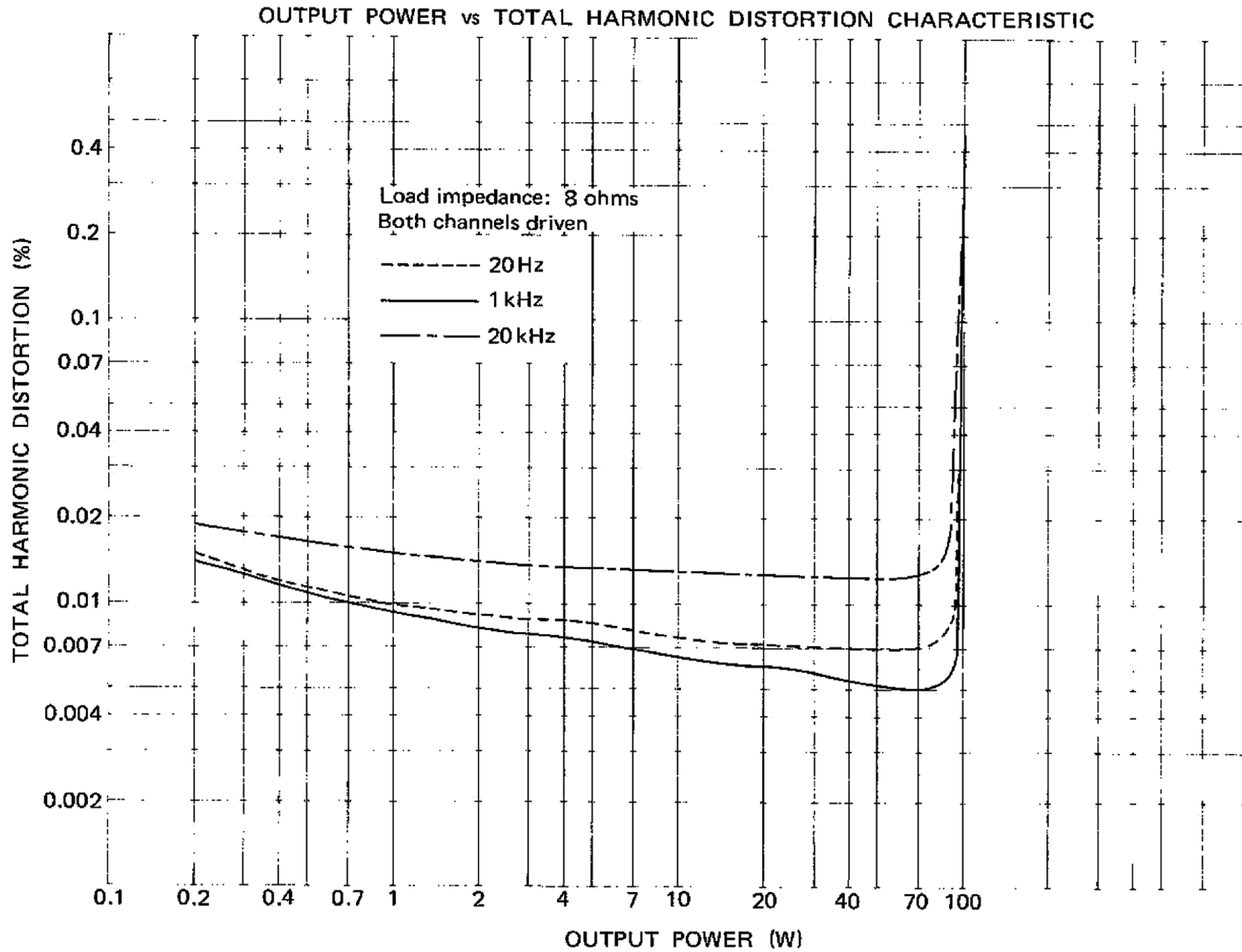
PROBLEM	PROBABLE CAUSE	CORRECTIVE ACTION
Unit will not turn on.	AC line cord is not connected properly.	Check line cord plug for positive connection at the outlet.
No sound from either channel.	Speaker selector is in "off" position.	Move speaker selector to "a", "b" or "c" position.
	Volume control is in "0" position.	Rotate the volume control.
	Speakers are shorted. (Protection indicator shows red)	Remove short and set power switch to "off" and again set it to "on".
	Tuner on/off switch is in "off" position.	Reset switch to "on" position.
	Function selector is in the wrong position.	Reset the function selector.
	Phono selector is in the wrong position.	Reset the phono selector.
	Tape monitor switch is set incorrectly.	Reset tape monitor switch.
No sound from one channel.	Balance control is set to one side.	Return balance control to center position.
	Speaker is not connected properly.	Check and reconnect speaker properly.
	Audio cable from program source is not connected properly.	Check and reconnect cables properly.
Volume is too low.	Volume control is not adjusted properly.	Rotate volume control.
	Muting switch is in "-20 dB" position.	Reset switch to "0 dB" position.
No FM stereo	Mode selector is in "mono" position.	Move switch to "stereo" position.
In phono mode there is an annoying hum.	Ground wire is connected improperly.	Check and reconnect ground wire.
	Polarity of AC line plug is wrong.	Reverse the AC line cord plug.
Lack of definition between channels (Lack of separation).	Speaker wiring polarity is wrong.	Check & reconnect wires with proper polarity.
Protection circuit indicator is always red.	Speakers are shorted.	Check speaker wiring to remove short and reset the protection circuit referring instructions on page 4.
Recording into tape deck is impossible.	Recording output selector is set incorrectly.	Reset the recording output selector.

MAINTENANCE

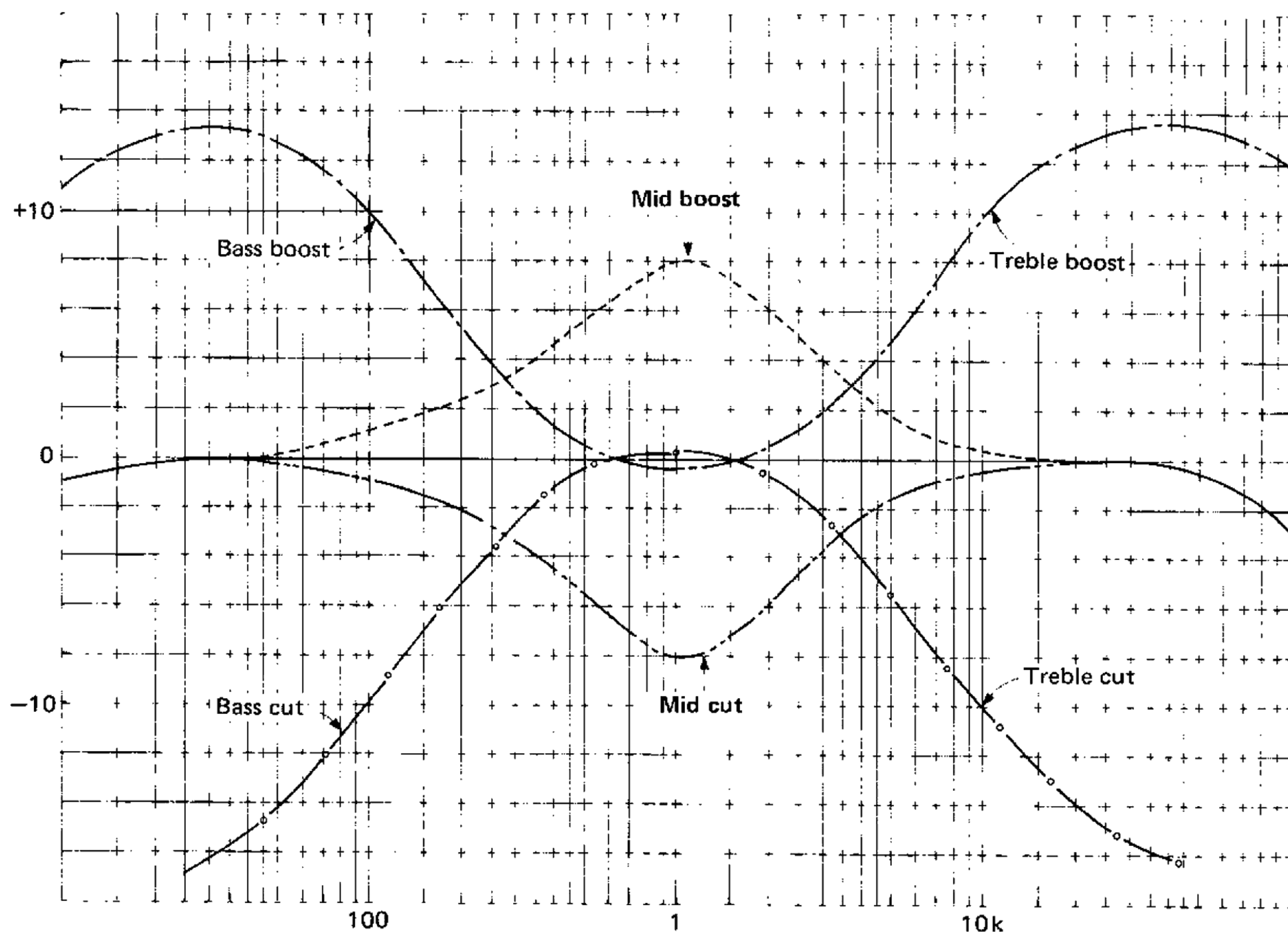
CABINET CLEANING

The cabinet has been designed to require little or no maintenance. It can be cleaned with a soft moist cloth and detergent. Never use strong solvents, benzene or thinner which may damage the finish.

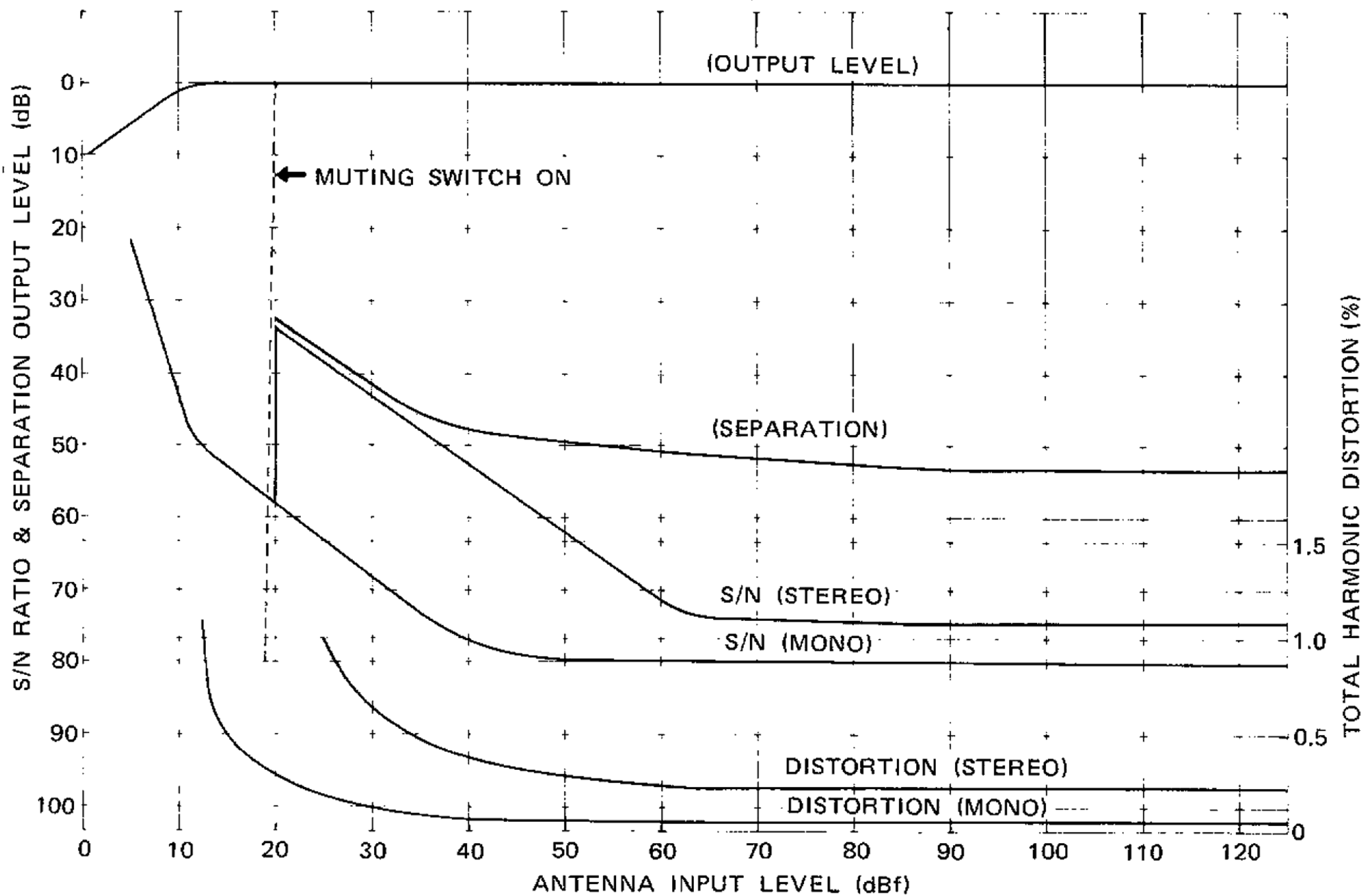
PERFORMANCE GRAPHS



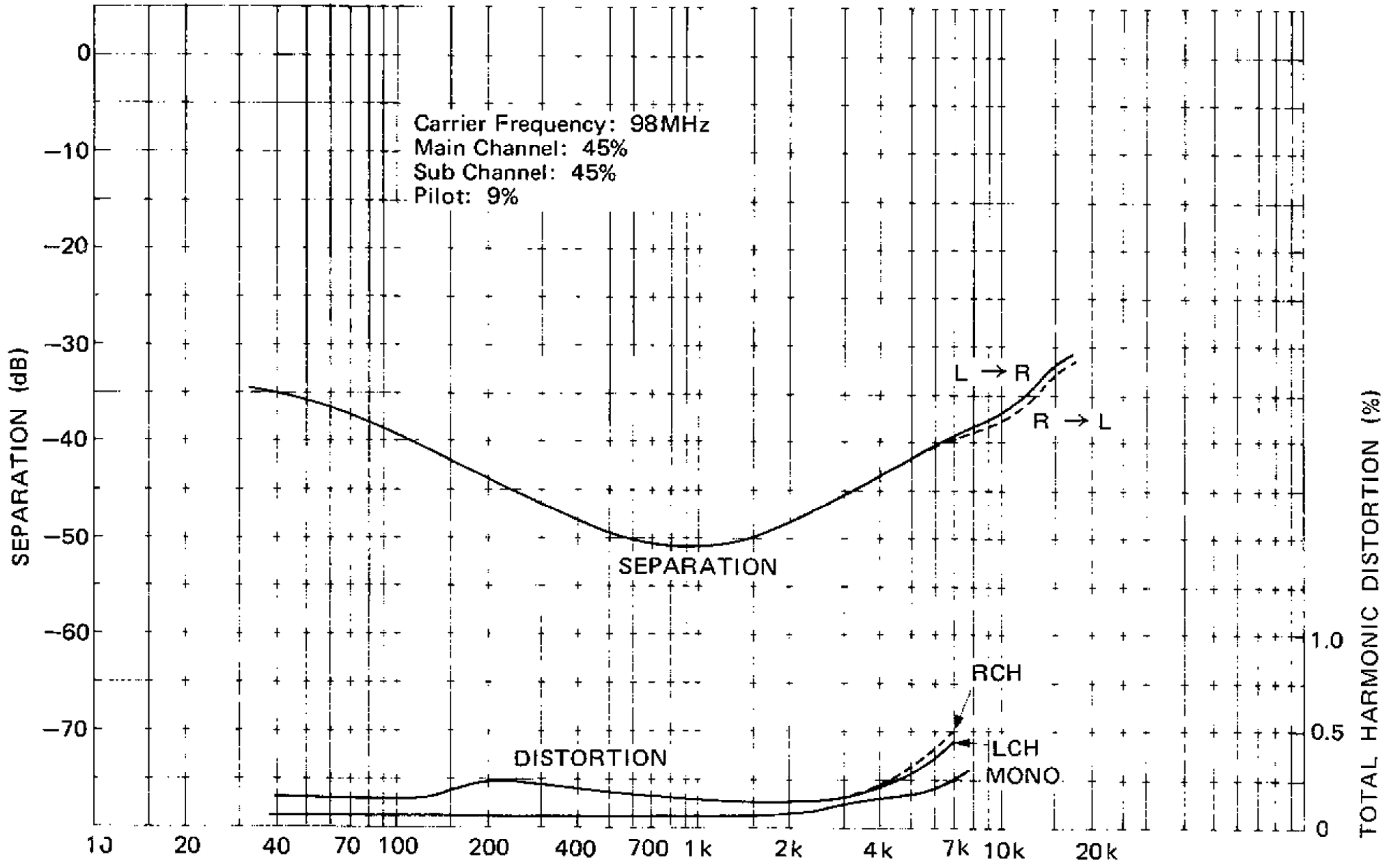
TONE CONTROL CHARACTERISTIC



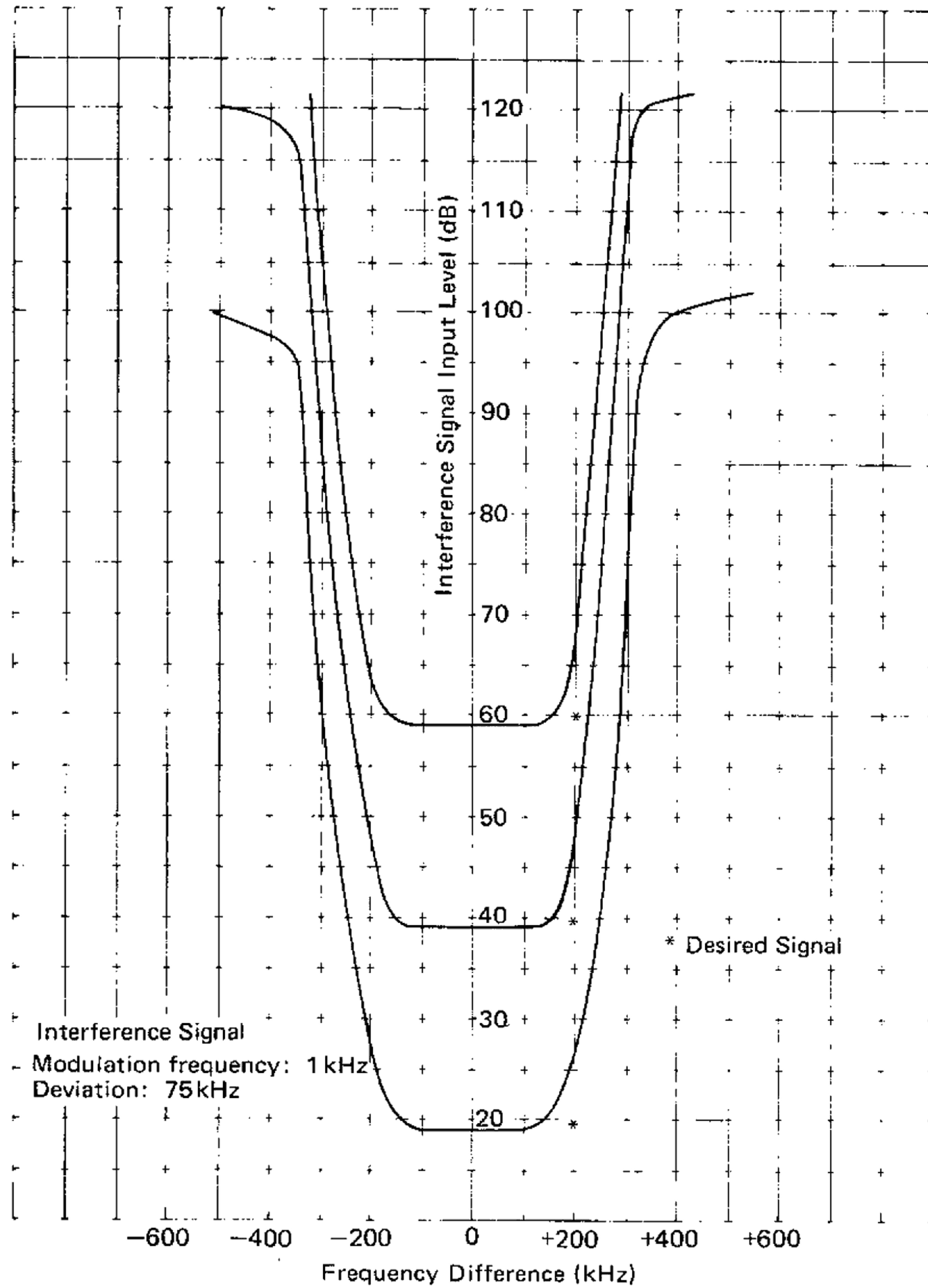
FM ANTENNA INPUT vs OUTPUT LEVEL, S/N RATIO, DISTORTION CHARACTERISTIC



MODULATION FREQUENCY vs SEPARATION CHARACTERISTIC & TOTAL HARMONIC DISTORTION CHARACTERISTIC



FM EFFECTIVE SELECTIVITY CHARACTERISTIC



SPECIFICATIONS

GENERAL DESCRIPTION

Power source:	120 V 50/60 Hz
Power consumption:	270 W
Semiconductors:	3-FET 6-IC (Integrated circuit) 57-Transistor 62-Diode 3-LED
Dimensions:	Width: 550 mm (21-21/32") Height: 182 mm (7-5/32") Depth: 405 mm (15-15/16")
Weight:	18 kg (39.7 lbs)

MAIN AMPLIFIER

Circuit:	Differential amplifier, complementary system, DC amplifier, OCL (Output Capacitor-Less)
Continuous power output:	85 watts per channel, minimum RMS, at 8 ohms, from 20 Hz to 20 kHz, with no more than 0.03% total harmonic distortion

Total harmonic distortion:	0.008% at 60 W (Aux. in)
Intermodulation distortion:	0.02% at 85 W (Aux. in)
Damping factor:	50 (at 1 kHz, 8 ohms)
Hum and noise level:	Residual; 0.6 mV Maximum volume; Aux.: 1 mV Phono: 10 mV Tape: 1 mV
Signal to noise ratio (IHF "A" network):	Aux.: 100 dB Phono: 80 dB Tape: 100 dB

PRE-AMPLIFIER

Circuit:	Equalizer; Three-stage direct coupled equalizer circuit Tone amplifier; NF type tone control
Input sensitivity and input impedance:	Phono 1 and 2; 2.5 mV/47 k ohms Aux.; 150 mV/100 k ohms Tape playback 1 and 2; 150 mV/47 k ohms
Phono overload:	280 mV (RMS. 1 kHz 0.03% THD.)
RIAA curve deviation:	(30 ~ 20 kHz) ±0.3 dB
Frequency response:	15 Hz – 50 kHz ± 1.5 dB (Aux., Tape playback)
Tone control:	Bass; ±10 dB at 100 Hz Mid; ±8 dB at 1 kHz Treble; ±10 dB at 10 kHz
Low cut filter:	30 Hz (-12 dB/oct)
High cut filter:	7 kHz (-6 dB/oct)
Audio muting:	-20 dB

FM

Tuning range:	87.6 – 108 MHz
Sensitivity (IHF):	9.8 dBf (1.7µV)
Total harmonic distortion:	Mono; 0.1% Stereo; 0.3%
Image rejection ratio:	95 dB
IF rejection ratio:	95 dB
Spurious rejection:	100 dB
AM suppression ratio:	60 dB
Selectivity:	75 dB
Signal to noise ratio:	Mono; 80 dB Stereo; 73 dB
Capture ratio:	1.2 dB
Stereo separation:	45 dB (1 kHz)

AM

Tuning range:	520 – 1620 kHz
Quieting sensitivity:	250µV/m
Image rejection ratio:	46 dB (1400 kHz)
IF rejection ratio:	32 dB (600 kHz)
Total harmonic distortion:	0.8%

Specifications are subject to change without prior notice:

CALLING FOR SERVICE

For your nearest Optonica authorized service station,

Please call Toll Free:

800-447-4700

Illinois:

800-322-4400

In Hawaii or Alaska, please contact your local dealer.

LIMITED WARRANTY

The maker of Optonica warrants this product to the original purchaser to be free from defective materials and workmanship, and agrees to repair any such defect or to furnish a new or equal part in exchange, through an Authorized Optonica Service Dealer or Station.

This warranty does not apply to appearance items nor to any product whose exterior has been damaged or defaced, nor to any product subjected to misuse, abnormal service or handling, nor to any product altered or repaired by other than an Authorized Optonica Service Dealer or Station.

This warranty does not apply to any product purchased outside the United States, its territories or possessions. **The period of this warranty covers two (2) years on parts and labor from date of purchase.**

This warranty entitles the original purchaser to have the warranted parts and labor rendered at no cost during the period of the warranty described above when carried into an Authorized Optonica Service Dealer or Station together with proof of purchase.

This shall be the exclusive written warranty of the original purchaser and neither this warranty nor any other warranty express or implied shall extend beyond the period of time listed above. In no event shall the maker of Optonica be liable for consequential economic damage or consequential damage to property.

Some states do not allow a limitation on how long an implied warranty lasts or an exclusion of consequential damage, so the above limitation and exclusion may not apply to you. In addition, this warranty gives specific legal rights, and you may have other rights which vary from state to state.

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OPTONICA

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