

**NAD**

**7000**

**AM/FM STEREO  
RECEIVER**

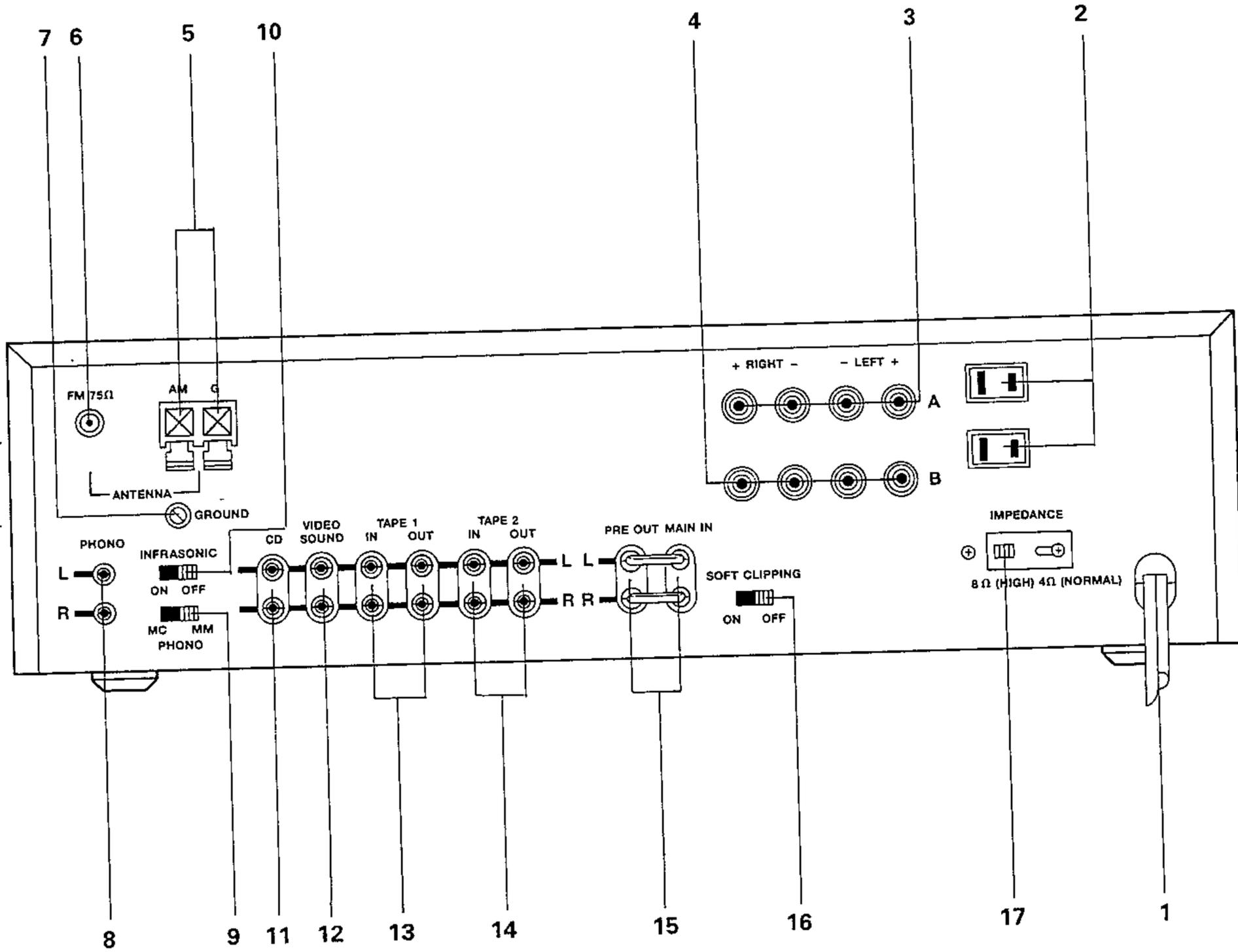
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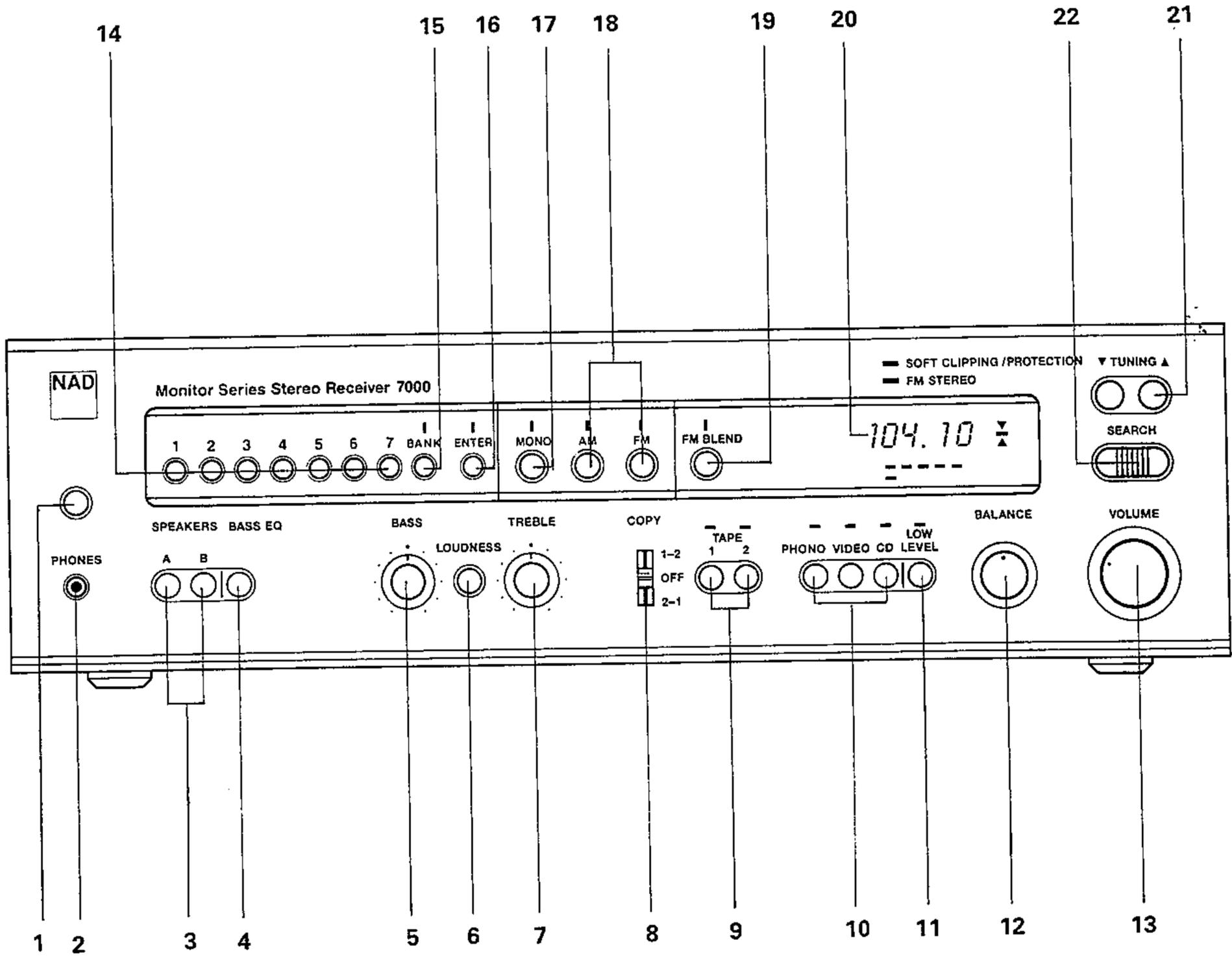
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## A NOTE ON INSTALLATION

This unit may be installed on any sturdy, level surface. Since its power transformer generates a magnetic hum field of moderate strength, a turntable (especially one with a moving-coil pickup cartridge) should not be located directly to the left of the receiver nor directly above it.

The receiver generates a modest amount of heat and thus requires some ventilation. Do not place it on a rug or other soft surface that it could sink into, obstructing the air inlets on the bottom. And be careful not to obstruct the air outlet grille on the top cover.

**CAUTION:** To prevent a fire or shock hazard, do not permit liquid or moisture to enter the receiver. If liquid is accidentally spilled on it, immediately shut off its power and unplug its AC power cord. Allow sufficient time for complete evaporation to occur before operating the receiver again. (If the liquid is anything but water and/or alcohol, the receiver should be examined by a service technician before power is applied to it.)

Do not open the receiver, or attempt to modify or repair it yourself. Refer all servicing to a qualified technician.

## REAR PANEL CONNECTIONS

### 1. AC LINE CORD

Plug the AC line cord into a "live" wall socket.

### 2. AC OUTLETS "PLEASE NOTE: There is only one AC outlet for European versions of this unit."

The AC power cords of other audio and video components may be plugged into these accessory outlets.

### 3. SPEAKERS A

The receiver is equipped with special high-current binding-post speaker terminals to handle the highest peak power levels that may occur with low-impedance speakers. Connect the loudspeakers with heavy-duty (16 gauge or thicker) stranded wire. Heavy-duty wiring is especially desirable if you are using speakers of low impedance or two pairs of speakers wired in parallel.

Each binding post consists of a threaded metal shaft and a plastic screw-on bushing. Connections may be made in either of two ways:

(1) A lateral opening in the base of each terminal accepts bared wires up to 14 gauge in thickness. Separate the two conductors of the cord, and strip off about a half-inch (1.25cm) of insulation from each. In each conductor, twist together the exposed wire strands. Unscrew the colored plastic bushing a few turns, insert the wire into the hole in the base of the terminal, and screw the bushing down tight until it grasps the wire and holds it securely.

Connect the wires from the left-channel speaker to the (L+) and (L-) terminals and the wires from the right channel speaker to the (R+) and (R-) terminals. Check to be sure that no loose strand of wire is touching any adjacent terminal or the chassis.

(2) A spring-type banana plug may be inserted axially into the end of each binding post. The binding posts have the inch (19mm) spacing required to accept standard dual-banana plugs. Purchase dual-banana plugs and install them on your speaker cables (or purchase speaker wires with dual-banana plugs already installed), and plug them into the binding-post terminals.

**Phasing.** Stereo speakers must operate in phase with each other in order to yield a good stereo image and to reinforce rather than cancel each other's output at low frequencies. If your speakers are easily moved, their phasing can easily be checked. Make the connections to both speakers, place the speakers face-to-face only a few inches apart, play some music, and listen. Then swap the connection of the two wires at the back of ONE of the speakers, and listen again. The connection which produces the fullest, boomiest bass output is the correct one. Connect the wires securely to the speaker terminals, being careful not to leave any loose strands of wire that might touch the wrong terminal and create a partial short-circuit; then move the speakers to their intended locations.

If the speakers cannot easily be set face-to-face, then phasing must rely on the "polarity" of the connecting wires. The speaker terminals on the receiver are labeled (+) and (-) in each channel. The terminals at the rear of the speakers are also marked for polarity, either via red and black connectors or

by labels: "+", "1", or "8" ohms for positive, "-", "0", or "G" for negative. As a general rule the red (+) terminal on the amplifier is to be connected to the red (positive) terminal of the speaker, in each channel.

To facilitate this, the two conductors comprising the speaker wire in each channel are different, either in the color of the wire itself (copper vs. silver) or in the presence of a small ridge or rib pattern on the insulation of one conductor. Use this pattern to establish *consistent* wiring to both speakers of the stereo pair. Thus if you connect the copper colored wire (or ribbed insulation) to the (+) amplifier terminal in the Left channel, do the same in the Right channel. At the other end of the wire, if you connect the copper colored wire (or the ribbed insulation) to the red or positive terminal on the left-channel speaker, do the same at the right channel speaker.

#### 4. SPEAKERS B

A second pair of loudspeakers may be connected to the amplifier, using the "B" group of terminals, in the same manner as the connections made to the SPEAKERS A terminals.

If the second pair of speakers is located near the first pair and will be played simultaneously, then they must be correctly phased with respect to the first pair as well as with each other. But if the second pair of speakers is located away from the first pair (in another room, for example) or will not be played at the same time as the first pair, then their phasing need not match that of the first pair. Of course, as with any stereo speakers, the second pair still must be in phase with each other.

The SPEAKERS B terminals may also be used to connect an adapter unit for electrostatic headphones. The black "-" terminals in each channel share a common ground.

Another useful option for the SPEAKERS B terminals is to connect a second pair of speakers wired for "ambience recovery", enhancing the apparent spaciousness of stereo recordings. Locate a pair of small loudspeakers along the side walls of the listening area, slightly behind the main listening area and as far as possible to the left and right. (Often it is useful to aim such speakers upward or toward the rear, so that their sound reflects randomly off the walls before reaching you). Connect a wire from the (L+) terminal to the positive terminal of the left-rear speaker, and a second wire from the (R+) terminal to the positive terminal of the right-rear speaker. Make no connections to the (L-) and (R-) terminals on the amplifier; instead, connect a wire from the negative terminal of the left-rear speaker to the negative terminal of the right-rear speaker. Thus wired, these rear speakers receive the left-minus-right "difference" portion of the composite stereo signal.

#### 5. AM ANTENNA TERMINALS

Some form of external antenna will be needed for satisfactory reception, since the receiver does not have a built-in antenna. For most local broadcasting stations a simple wire up to one meter (three feet) in length will provide ample signal strength, and such a single-wire antenna is included with the receiver.

Connect one end of the wire to the AM terminal. The remainder of the antenna may be allowed to hang down behind the tuner or may be tacked in place horizontally along the rear of a wooden - not metal - shelf. (A metal shelf may

interfere with reception. In that case, the wire should be stretched out along the wall away from the shelf and tacked in place). You may wish to experiment with the orientation of the AM antenna, in order to find the position that provides the best reception of the stations you listen to most often.

The short-wire antenna usually will provide satisfactory reception of local AM broadcast stations. But if you wish to improve reception of distant AM stations, attach a long-wire outdoor antenna to the AM terminal. As its name implies, a "long-wire" antenna is a simple, straight wire whose length may be anything from a few feet up to about 100 feet (30 meters), mounted parallel to the earth and as high as is convenient.

In some cases the effectiveness of a long-wire antenna will be improved by connecting a second wire from the Ground (G) terminal to a true earth-ground, i.e. a copper-plated rod driven several feet into the earth. A substitute electrical ground may also prove effective: a cold-water pipe, a steam radiator, or the third hole of a modern electrical wall socket.

In order to make connections to the two antenna terminals, strip off 1 cm of insulation from each wire, and in each conductor twist together the exposed wire strands.

Press down the spring-loaded plastic tab below the appropriate terminal, and hold it down while inserting the wire. Insert the bared wire into the small hole in the terminal, and release the tab. The terminal will grasp the wire and hold it in place.

#### 6. FM ANTENNA INPUT

The FM antenna input socket is designed to accept a 75-ohm "co-axial" cable. This type of shielded cable is employed with community cable systems, apartment building master antenna systems, and most roof-mounted antennas.

If you want to connect an antenna with a 300-ohm twin-lead wire, use a "balun" (an adapter containing a 300-to-75-ohm transformer).

An antenna must be connected to the receiver for effective reception of stereo FM broadcasts. A ribbon-wire "folded dipole" antenna and a balun adapter are included to get you started. When stretched out, the ribbon-wire antenna is in the form of a T. The "crossbar" portion of the T should be stretched out horizontally and tacked in place (on a wall, on the back of a cabinet, or on the floor). The "vertical" section of the T goes to the receiver's antenna input. Connect its two wires to the screw terminals on the balun adapter; then plug the balun into the receiver's FM input socket.

In view of the exceptional sensitivity of this receiver, you may find that the ribbon-wire dipole antenna is all you need for reception of strong local stations. But this simple antenna is not very efficient at rejecting "multipath" and other forms of FM interference, and it cannot easily be rotated to optimize its pickup pattern for best reception of stations in different directions. Therefore, in most cases you should use a better antenna. The recommended options, in order of increasing cost, are as follows:

(1) A basic "rabbit-ears" indoor TV antenna without auxiliary coils or tuning switches. Electrically, such an antenna is just another dipole (similar to the ribbon-wire antenna). But since its tuned elements are made of solid metal, it can easily be rotated. Stretch out each of its two arms to a length of 30 inches (75 cm), and orient them

horizontally or at a shallow angle less than 45 degrees upward. The ribbon wire emerging from the antenna's base should be connected to the balun adapter's screw terminals in place of the simple ribbon-wire antenna. Now, for each station in turn, after you tune the station you can rotate the antenna for best reception.

(2) A more elaborate rabbit-ears indoor TV antenna with a tuning switch. This type of antenna does NOT have greater sensitivity than the simpler rabbit-ears unit, so if your problem is that the signals you want to receive are weak (as shown on the signal-strength meter), then an outdoor antenna is the only effective solution. But in cities and in large buildings where signals are strong but are contaminated by reflected "multipath" interference, the tuning switch on an elaborate indoor antenna may improve reception by reducing the interference.

(3) An electrically tuned indoor antenna. Again, such antennas usually do not provide any advantage over the simplest type of "rabbit-ears" unit for receiving weak signals. But where strong signals are contaminated with interference, the antenna's aiming and tuning controls can reject the interference and yield cleaner reception.

(4) An outdoor antenna. Even the finest indoor antenna, no matter how elaborate, cannot fully exploit the capabilities of a good FM tuner. For the lowest noise, minimum distortion, and largest choice of well-received broadcasts, an outdoor antenna is the best complement to a fine tuner.

A roof-mounted antenna has three fundamental advantages. First, its large size yields better sensitivity (pulling in a stronger signal from the desired station) and a narrower directional pattern for more effective rejection of multipath reflections arriving from other directions. Second, its location on a roof or tall mast places it above many sources of interference - passing cars and buses, other buildings, etc. Third, the strength of received FM signals is directly proportional to the height of any antenna above the ground.

If you already have an outdoor television antenna, using a splitter to extract FM signals from it may produce excellent results. However, many TV antennas are deliberately designed to be relatively weak at FM frequencies in order to minimize potential interference with TV signals at nearby frequencies (Channel 6 in the U.S.). You may be able to use a splitter to extract FM signals from an apartment building's master TV antenna system, but usually this yields poor results because many master antenna systems have "traps" to stop FM signals.

The best choice is a directional FM-only antenna, mounted as high above ground as is practical, and separated by at least two meters (7 feet) from other antennas, vertically and horizontally. If desired stations are located in different directions (more than 90 degrees apart), the antenna should be mounted on a rotor for aiming. Brand names of good FM antennas in the U.S. include Jerrold, Finco, Wineguard, Antennacraft, and Archer (Radio Shack).

Use shielded lead-in cable rather than plain "twin-lead" wire, both to minimize interference and to preserve strong signals during years of weathering. The cable may be either 75-ohm coaxial or a shielded 300-ohm type. Disconnect any indoor antenna before connecting the cable from the outdoor antenna.

If you install an outdoor antenna yourself, observe these important CAUTIONS:

1. Do not mount the antenna close to electric power lines. Plan the installation so that the antenna mast cannot accident-

ally touch power lines, either while you are installing it or later.

2. Include a lightning arrester in the installation, to protect both yourself and the tuner circuit from potential danger during electrical storms.

## 7. PHONO GROUND

If your turntable is equipped with a grounding wire (usually a green wire terminating in a U-shaped spade lug), connect it to this terminal. Turn the thumb-nut counter-clockwise, place the spade lug under the nut, and tighten the thumb-nut clockwise to secure the lug. If the grounding wire has no spade lug, strip off 1 cm of insulation to expose the bare wire, twist the wire strands tightly together, insert the wire through the small hole in the shaft of the Ground terminal, and tighten the thumb-nut to fasten the wire in place.

If you encounter a persistent low-level hum or buzz in the sound connect a wire from the Ground terminal to a true earth-ground, i.e. a copper-plated rod driven several feet into the earth. A substitute electrical ground may also prove effective: a cold water pipe, a steam radiator, or the third hole of a modern electrical wall socket.

## 8. PHONO INPUT

Plug the signal cables from your turntable into these jacks. If the cables or plugs are color-coded, refer to your turntable's instruction manual to learn which cable or plug is the Left channel (upper jack) and which for the Right (lower jack). Be careful to insert each plug fully into the socket so that the plug's metal skirt fits tightly over the exterior of the socket. If necessary, crimp the plug's metal skirt slightly so as to obtain a tight fit with the socket.

## 9. MM/MC SELECTOR

The switch sets the input sensitivity and gain of the phono preamplifier circuit. Set it according to the output level of your phono cartridge. Set the switch at MM for cartridges of the moving magnet, induced magnet, moving flux, and moving iron (variable reluctance) types, and for "high-output" moving-coil pickup, i.e. those with a rated output of 1.0mV or greater. If your cartridge is a low-output moving-coil pickup (with a rated output of less than 1.0mV), set the switch at MC.

Here is another way to determine the preferred setting of the MM/MC switch. Begin by setting it to MM. After you have completed the installation and wiring of the system, play a record. With the front-panel LOW LEVEL button OUT you should obtain a satisfyingly loud volume level with a VOLUME control setting between 9 o'clock and 3 o'clock. If you have to turn up the VOLUME control beyond 3 o'clock to get adequately loud sound, turn the VOLUME back down and re-set the MM/MC switch to MC.

## 10. INFRASONIC FILTER

The output from a record player contains strong but inaudible signals at infrasonic frequencies (below 20Hz) caused by disc warps, stylus/tonerarm resonance, and vibrations reaching the turntable. If these non-musical signals are amplified at full strength they may waste amplifier power and produce excessive woofer cone motion, muddying the sound. The infrasonic filter attenuates this unwanted contamination.

Loudspeakers with "vented" cabinets (i.e. bass-reflex, ported, auxiliary bass radiator, and drone-cone designs) are especially susceptible to being overdriven by infrasonic signals. If your speakers are of this type, you should keep the Infrasonic Filter switched ON, especially when playing LP records.

If you have sealed-cabinet (acoustic suspension) loudspeakers, or if you listen mainly to Compact Discs or tapes, the infrasonic filter may be switched OFF.

NOTE: A second infrasonic filter is included in the BASS EQ circuit and is automatically engaged when the bass equalization is used. It is not affected by the Infrasonic Filter switch.

## 11. CD INPUT

Connect the audio signal cables from a digital Compact Disc player to these jacks.

If you don't have a CD player, any other line-level signal source (such as a spare tape deck) may be connected to the CD input.

## 12. VIDEO SOUND INPUT

Connect a video-related audio signal here, such as the audio output from a video cassette recorder, video disc player, TV monitor/receiver, or stereo television decoder.

Alternatively, any "line-level" audio signal may be connected here, such as the playback from a spare tape deck.

## 13. TAPE 1 INPUT/OUTPUT

The tape connections may be used with recorders of all types: cassette, micro-cassette, open-reel digital, etc. To make recordings, connect a stereo patch cord from the TAPE 1 output jacks to the recorder's LINE IN jacks (not to its microphone inputs). To play back tapes, connect a stereo patch cord from the recorder's LINE OUT jacks to the TAPE 1 input jacks.

## 14. TAPE 2 INPUT/OUTPUT

These jacks allow you to connect a second tape recorder of any type, and the receiver is wired to permit copying tapes from one recorder to the other. Connect a cable from the TAPE 2 output jacks to the recorder's LINE IN jacks, and another cable from the recorder's LINE OUT jacks to the TAPE 2 input jacks.

The TAPE 2 jacks may be used for a signal-processing accessory instead of a second tape recorder. Examples of such accessories include a dynamic range processor, a dynamic noise filter, or any other device whose operation depends on the setting of a signal threshold. Connect a patch cord from the TAPE 2 output jacks to the processor's inputs, and another patch cord from processor's outputs to the TAPE 2 input jacks.

Other signal processing accessories, such as a graphic equalizer or the special equalizer supplied with some loudspeakers may be connected either to the Tape jacks or at the PRE-OUT jacks. The choice is a matter of convenience.

## 15. PREAMP OUT, MAIN IN

Each channel of the amplifier includes two independent sections or stages: the control preamplifier (including the phono preamp and most front-panel controls), and the power amplifier (which provides the power to drive loudspeakers). In normal operation the preamp and power amp are connected together via factory-installed U-shaped metal jumpers that bridge the PRE-OUT and MAIN-IN jacks. Check to be sure that they are fully inserted into the jacks and that nothing is touching them.

By removing the metal jumpers (after first switching OFF the POWER), you can connect various signal-processing accessories in the path between preamp and power amp: an equalizer, a time-delay ambience reproducer, a stereo image enhancer, an electronic crossover, etc. To use a signal processor, connect a stereo patch cord from the PRE-OUT jacks to the processor's line-level input jacks, and a second patch cord from the processor's output jacks to the amplifier's MAIN-IN jacks.

NOTE: Any signal processor whose operation depends on the setting of a threshold, such as a dynamic noise filter, should be connected to TAPE IN/OUT jacks - where the signals are unaffected by the amplifier's volume and tone controls - rather than to the PRE-OUT jacks.

If you remove the metal jumpers, save them in case you may want to disconnect the signal processor and return to normal operation at a later time. If the jumpers should be lost, a conventional stereo patch cord can be used to connect PRE-OUT to MAIN-IN in each channel.

This receiver can be used as the heart of an elaborate audiophile sound system. The preamp output is capable of driving several power amplifiers simultaneously, or of driving the long signal cables required to connect to power amps which are located near the speakers (or to "powered" active loudspeakers with built-in power amplifiers).

## 16. SOFT CLIPPING

When an amplifier is overdriven beyond its specified power output it normally produces "hard clipping" of the signal with harsh distortion and power-supply buzz as the output transistors saturate. The NAD Soft Clipping circuit gently limits the output waveform and minimizes audible distortion when the amplifier is overdriven. If your listening involves moderate peak power levels, the Soft Clipping may be left OFF. But we recommend that it be switched ON when playing music at very high levels that might exceed the amplifier's power capacity.

## 17. SPEAKER IMPEDANCE

The impedance of a loudspeaker varies with frequency, and in many loudspeakers the impedance is lowest at the frequencies where the highest power demands occur in music. In many "8Ω" loudspeakers this minimum impedance is from 4 to 6 ohms. If you connect two pairs of 8-ohm speakers to the receiver the nominal impedance of the combination is 4 ohms.

For these reasons, all NAD amplifiers and receivers are designed to produce maximum power output into a 4-ohm impedance, and 4Ω is the Normal setting of the Impedance selector. If you are not sure of the true impedance of your speakers, or if you are connecting two pairs of speakers,

leave the Impedance switch at 4Ω (NORMAL).

If you are using a single pair of loudspeakers whose true impedance is above 6 ohms at all frequencies, you can optimise the amplifier for maximum power delivery at this higher impedance by re-setting the switch to 8Ω (HIGH).

To prevent accidental re-setting, the Impedance switch is held by a slotted bracket which is fastened by a screw next to the switch. Use a small screwdriver to loosen the bracket screw, turning it about a half-turn clockwise, and then slide the switch to the 8Ω (HIGH) position. The bracket will move with the switch. Tighten the screw to secure the switch in its new position.

**CAUTION:** If the impedance switch is set to 8Ω (HIGH) with loudspeakers whose true impedance is lower than 6 ohms, or with two pairs of speakers connected in parallel, the amplifier will tend to overheat and shut down when operated at high output levels. The receiver will resume normal operation after it cools; but such abuse could also cause internal fuses to blow in order to protect the amplifier. If this occurs, return the receiver to your dealer for service.

## FRONT PANEL CONTROLS

### 1. POWER

Press to switch on the power. To switch the power off, press the Power button again.

When the AC line cord is plugged in but the power is switched off, a green LED at the bottom of the tuning display glows to indicate that the unit is in standby mode, ready for remote-control operation. When the power is switched on, the LED turns off; thereafter it glows only when commands are received from the remote control.

When the power is switched on, the LOW LEVEL mode is automatically engaged. Press the LOW LEVEL button to raise the volume to normal.

### 2. PHONES

Plug stereo headphones in here. The circuit will provide proper drive signals for all conventional stereo headphones regardless of their impedance, with just one exception: electrostatic headphones usually are supplied with an adapter unit which must be connected directly to the speaker terminals on the rear panel.

Before plugging any headphones in, turn down the VOLUME control for safety. And when you are not listening to the headphones it is wise to unplug them from the PHONES jack. Otherwise, when not wearing the phones you might inadvertently turn up the volume to a high level and feed dangerously strong signals to the headphones.

You may freely use headphone extension cables. If you want to use a headphone Y-connector to drive two headsets simultaneously, they should be identical models. Connecting together two headphones that differ widely in impedance usually will produce a substantial loss of volume in the headset having the higher impedance (or in both).

### 3. SPEAKERS A/B

When only button "A" is engaged, sound is heard only from the loudspeakers connected to the SPEAKERS A terminals on the rear panel. When only button "B" is depressed, the SPEAKERS A terminals are shut off and sound is heard only from the loudspeakers connected to the SPEAKERS B terminals.

If A and B are both pressed, the amplifier's output power is fed to both sets of speakers in parallel. If both A and B are disengaged (with the buttons OUT), both sets of speakers are silenced.

Thus if you have your main stereo speakers wired to the "A" terminals and a set of extension speakers wired to the "B" terminals, you can choose to hear only the main speakers (by pressing button A), only the extension speakers (by disengaging button A and pressing button B), or you can activate both by depressing both buttons.

The amplifier's output signal is present at the PHONES jack at all settings of these buttons. When using headphones it normally is advisable to switch OFF the loudspeakers by setting these buttons OUT. Then your VOLUME control may freely be used to adjust the loudness level in the headphones with no fear of overdriving the speakers or disturbing neighbors.

If you have connected an adapter unit for electrostatic headphones to the SPEAKERS B terminals, you can use the SPEAKERS switches to select your main stereo speakers (A) or the headphones (B).

If you have connected speakers wired for "ambience recovery" to the SPEAKERS B terminals, you can use the SPEAKERS pushbuttons to listen to conventional stereo (A only), to switch off the main speakers and listen only to the stereo L-minus-R "difference" signal in the rear speakers (B only), or to listen to spatially enhanced stereo (both A and B depressed). You will find that the stereo difference signal is usually lacking in bass. If the difference signal is very weak, the recording lacks stereo separation.

#### 4. BASS EQ

This circuit boosts the lowest bass frequencies, those below 60Hz. In virtually all loudspeakers the useful output rolls off at frequencies below the woofer/cabinet resonance (which typically occurs between 40 and 70Hz). The BASS EQ circuit compensates for this rolloff, extending the useful response of the speakers significantly lower in frequency.

If your loudspeakers already have extended and powerful deep-bass response, the BASS EQ provides other benefits:

- It helps to correct the rolled-off bass in some recordings.
- It provides effective "loudness compensation" to restore subjectively correct tonal balance at low volume levels.
- It helps to compensate for listening-room acoustics. ("Standing waves" in the room tend to weaken the low bass and reinforce the mid-bass at typical listening positions).

Of course very low frequencies are not found in all music, nor in all recordings, so the effect of the BASS EQ often won't be obvious. Sometimes you may find that switching it in and out does not produce any apparent change in the sound, simply because the recording contains no energy at very low frequencies. But usually the BASS EQ will provide an audible (and occasionally a dramatic) strengthening of the deepest bass.

The BASS EQ circuit also includes an infrasonic filter that rolls off the response below 25Hz to prevent inappropriate amplification of non-musical signals below the audio range.

**CAUTION:** Be prepared to switch off the equalization when playing recordings (especially digitally mastered discs) that contain unusually powerful recorded bass. The combination of a high playback volume level, the BASS EQ, and a bass-heavy input signal could overdrive the amplifier into clipping and - more important - overdrive your woofers beyond their safe excursion limits, causing the voice-coils to clatter against the magnet back-plates. (This risk is particularly serious with small woofers, those smaller than six inches in diameter, which usually are not designed to accept high power levels at the lowest frequencies.) As long as a speaker sounds good it probably is OK; but distorted or unmusical sounds, such as clattering or buzzing, signal distress in a woofer.

Be alert, also, for signs of acoustic feedback (in which the low-frequency vibrations from the speakers are picked up by the record-playing stylus and are re-amplified). If you encounter a sustained low-frequency roar, or frequent groove-jumping, immediately turn down the Volume and switch off the

BASS EQ until a more nearly vibration-free mounting for the turntable is found.

#### 5. BASS

The Bass control adjusts the relative level of the low frequencies in the sound. The electrical response of the amplifier is flattest when the control is set in the detent at the 12 o'clock position. Rotation of the knob to the right (clockwise) increases the level of low-frequency sounds, and rotation counter-clockwise decreases their level. Adjust the Bass control to achieve the tonal balance that sounds most natural to you.

At moderate rotations away from center the effect of the Bass control is subtle, because its action is confined to the lowest audible frequencies where significant energy is seldom found in recordings. Only at large rotations away from center is there a substantial boost or cut at the mid-bass frequencies that are common in music.

#### 6. LOUDNESS COMPENSATION

This button engages a "loudness compensation" circuit which, at low-to-medium settings of the Volume control, boosts the bass response of the amplifier in order to compensate for the human ear's diminished sensitivity to low-frequency sounds at low loudness levels. The circuit also provides a slight treble boost to overcome the "masking" of subtle high-frequency details by background noise.

Instead of using this button, you may prefer to use the tone controls and BASS EQ to obtain the tonal balance that sounds most natural to you, at any volume level.

#### 7. TREBLE

The Treble control adjusts the relative level of the high frequencies in the sound. The response of the amplifier is flattest when the control is set in the detent at the 12 o'clock position. Rotation of the Treble control to the right (clockwise) increases the level of high-frequency sounds, and rotation counter-clockwise decreases their level. Adjust the Treble control to achieve the tonal balance that sounds most natural to you.

Boosting the Treble increases the brilliance and clarity of details in the sound, but also makes any noise more prominent. Turning down the Treble makes the sound mellower while suppressing hiss and record surface noise; but too much Treble roll-off will make the sound dull.

#### 8. TAPE COPY

The Copy switch selects the signal that is fed to the Tape Out jacks for recording or signal processing. It has three settings.

**OFF.** When the Copy switch is OFF, the signal chosen by the Input Selector (CD, Phono, et al) is fed to both Tape Out jacks. If you have two tape recorders, the selected input signal may be recorded on either recorder, or simultaneously on both. Use the Tape monitor buttons to listen to the signal going through either recorder (Tape 1 or Tape 2), or disengage both Tape buttons to hear the input signal directly.

If you have connected a tape recorder to Tape 1 and a signal processor to Tape 2, the unprocessed input signal may

be recorded on Tape 1 and will also be fed to the signal processor. Press Tape 1 to check the signal being recorded or Tape 2 to hear the processed input signal.

**1>2.** When the Copy switch is set at 1>2, the playback signal from Tape 1 In is fed to Tape 2 Out. This permits recordings to be copied from Tape 1 to Tape 2.

Use the Tape monitor buttons to hear either the source (Tape 1) or the copying recorder (Tape 2). Or, by disengaging both Tape monitor buttons, you may listen to any other signal source (CD, Phono, et al) while the copying proceeds. Changes in the settings of the input selector and Tape buttons do not affect the tape copying process.

If you have connected a tape recorder to Tape 1 and a signal processor to Tape 2, then the 1>2 setting of the Copy switch will feed the tape playback signal to the signal processor. Then you can press Tape 1 to hear the playback signal directly or Tape 2 to hear the processed version of the tape playback.

**2>1.** When the Copy switch is set at 2>1 the direction of the copying is reversed: the playback signal from Tape 2 In is fed to Tape 1 Out. This permits recordings to be copied from Tape 2 to Tape 1

If you have connected a tape recorder to Tape 1 and a signal processor to Tape 2, the 2>1 setting of the Copy switch allows you to process the input signal before recording. The selected input signal (CD phono, et al) will be fed to Tape 2 (the signal processor); then the output from the processor is fed to Tape 1 for recording. Press Tape 2 to hear the processed signal before recording, Tape 1 to hear the signal that has passed through the tape recorder, or disengage both Tape monitor buttons to hear the unprocessed input signal.

**CAUTION:** In this mode, with some combinations of equipment a feedback path could be set up in which the signal circulates repeatedly, producing a loud squeal that could damage your loudspeakers. Turn down the Volume when making connections and when initiating recordings.

**NOTICE:** Tape copying is a convenience intended for personal use. If you copy commercially-produced recordings and sell or give away the copies, you may be violating the copyright or the property rights of the producer of the recording.

## 9. TAPE 1, TAPE 2 (MONITOR)

The Tape buttons let you hear the output signal from tape decks (or signal processors) connected to the Tape 1 and Tape 2 jacks. When either Tape button is engaged it overrides the Input Selector.

To disengage either Tape button, press the button again and release it.

**NOTE:** If either Tape button is engaged with no tape deck connected, or with a tape machine connected but not running, you will hear only silence - regardless of the settings of any other amplifier controls.

The Tape buttons allow you to listen to recorded tapes and to check on your own tape recordings as they are being made. If you have a three-head audio recorder that permits off-the-tape monitoring, then by engaging the Tape buttons on both the receiver and the recorder, you can hear the playback signal from the tape immediately after it is recorded, to monitor its quality.

With two-head audio recorders, HiFi VCRs, and most digital recorders, the "monitor" signal heard while recording is not from the tape but is merely the signal passing through the recorder's electronics (including its Recording Level controls). In this case the Tape buttons allow you to check the left/right balance of the signal as it is recorded.

The Tape buttons select only the output signal from tape recorders (or from signal processors); they have no effect on the signals that are being recorded. Selection of a signal for recording is controlled only by the Input Selector and the Copy switch.

## 10. INPUT SELECTOR (PHONO, CD, VIDEO)

These buttons, together with the AM and FM buttons on the tuner panel, select the input signal for the preamplifier. If the COPY switch is OFF, the selected input signal is also fed to the Tape circuits for recording.

If the Tape monitor buttons (Tape 1 and Tape 2) are disengaged, the selected input signal is fed to the power amplifier and so to the loudspeakers. If Tape 1 or Tape 2 is selected, it overrides the input selection.

If Tape 1 or Tape 2 is engaged, the selected input signal continues to be fed to the Tape Out jacks for recording (or signal-processing), but the signal returning from the tape recorder (or processor) is selected for listening

## 11. LOW LEVEL

This button reduces the volume of the amplified sound by approximately 20 decibels. It has no effect on the signal fed to the TAPE OUT jacks for taping or processing. The LOW LEVEL switch has several practical uses

- It extends the useful range of the Volume control. With high-output signal sources, with efficient loudspeakers, or with sensitive headphones, you may find that the sound is too loud over most of the range of the Volume control, so that you are restricted to using only settings near the lower end of the control range. In this case, engaging the Low Level switch to reduce the output level will allow you to use the full range of the Volume control for normal listening.

- It provides optimum signal-to-noise ratio for low-level listening in quiet environments. For example, if you are listening to soft music late at night when the surroundings are quiet, the Low Level switch minimizes the already-low residual noise of the preamplifier and tone-control circuits, ensuring noise-free listening.

- It provides a convenient temporary cut in volume, to be used while answering the telephone for instance. When the button is pressed again and released, it restores the volume precisely to the pre-set level.

**Note:** The LOW LEVEL mode is engaged automatically when the power is switched on.

## 12. BALANCE

The Balance control adjusts the relative levels of the left and right channels. It has no effect on recordings being made. A detent at the 12 o'clock position marks the point of equal balance. Rotation of the Balance control to the right (clockwise) decreases the level of the left channel so that only the right channel is heard, thus shifting the sonic image to the right. Rotation of the control to the left shifts the sonic image toward the left speaker.

Ideally the detented center position of the Balance control will be the normal setting. But several common circumstances may cause unequal balance, requiring an off-center setting of the Balance control to restore the most uniform spread of stereo sound between the speakers. These include unequal output from the two channels of the phono cartridge, different acoustical environments around the two loudspeakers, or simply a listening position that is closer to one speaker than to the other.

Adjust the Balance control to produce a natural spread of sound across the space between the speakers, with any monophonic sound (such as a radio announcer's voice) appearing as a phantom image centered midway between them.

### 13. VOLUME

The Volume control adjusts the overall loudness level of the sound. It has no effect on the level of the signals fed to the TAPE OUT jacks for tape recording. The Volume control is designed for accurate tracking of its two channels, so that the stereo balance will not shift noticeably as the loudness of the sound is varied.

### 14. STATION PRE-SETS

You can store the frequencies of fourteen stations in these pre-sets, using the BANK and ENTER buttons. Then, to tune those stations from day to day, just select the appropriate bank and press the desired pre-set button. The tuner will automatically switch to AM or FM accordingly.

The circuit has a "last station tuned" memory. When the power is switched on, or when you switch from one tuning band to the other, it automatically re-tunes to the last station that you used on that band.

The pre-sets preserve their frequency assignments when the AC line cord is unplugged, for a period of at least two weeks. Thus you can re-arrange your stereo system, or move the equipment from room to room, without losing the pre-set frequencies. But if you leave the power off for a month or more, you may have to re-program the tuning pre-sets

### 15. BANK SELECTOR

This button selects which group of seven programmed stations is assigned to the pre-set buttons. The LED above the BANK button changes color to indicate which bank is in use.

### 16. MEMORY ENTER

This button engages the Memory Enter mode. Use this mode to enter the frequencies of your favorite stations into the fourteen memory pre-sets (two banks of seven). The procedure is as follows.

1. Decide which station you want to assign to each of the fourteen pre-sets. You may arrange the stations in any order that you find easy to remember or convenient to use. For example the arrangement may be alphabetical (1 = WABC, 2 = WCBS, 3 = WNYC ...), numerical (1 = BBC1, 2 = BBC2, ...), or in order of increasing frequency (1 = 89.7, 2 = 90.9, 3 = 95.3, etc). You may enter FM stations in one bank of seven pre-sets and AM stations in the other bank, or intermix AM and FM stations in each bank. For example you could store the children's favorite stations in one bank and the parents' favorites in the other bank.

2. Select the FM or AM band, as appropriate. Tune to the first station on your list. If you are not certain of station frequencies, check the station/frequency directory in a local newspaper or broadcasting guide. Check the signal-strength display (AM) or center-tune indicator (FM) to be sure that you have tuned precisely to the center of the station's broadcast channel.

Press the BANK button to select the bank that you want to store the first station in. Press the ENTER button, then press Pre-set # 1 to store the first station in the tuner's memory. (NOTE: After you press ENTER, you will have approximately ten seconds to store a station in one of the pre-sets. After that interval, the ENTER mode will automatically deactivate.)

3. Tune to the second station on your list. Press the ENTER button and, within ten seconds, press Pre-set #2 to store the second station.

4. Tune to the third station on your list, press ENTER, and press Pre-set #3 to store the station. Continue in this manner until you have stored seven stations in the first seven presets. Then press the BANK button to switch to the second bank of pre-sets, and continue the process for the second group of seven stations.

Incidentally, if you make a mistake or change your mind, it is not necessary to re-program the pre-sets in sequence. You can re-program any pre-set simply by tuning to the desired frequency, pressing ENTER, and pressing the pre-set that you want to re-program.

After you finish programming the pre-sets, you may wish to post your list of stations and associated pre-set numbers nearby for reference.

**CAUTION:** In day-to-day operation, be careful not to press the ENTER button by accident. Doing so will activate the ENTER mode, and if you then press any of the pre-set buttons you will unintentionally re-program that pre-set. You would then have to manually re-tune to the station you wanted, and re-ENTER it into the pre-set

If you press ENTER accidentally, you may wait ten seconds for the ENTER mode to disengage. Or you can immediately force the tuner out of the ENTER mode in either of two ways: switch to the other tuning band (eg. from FM to AM and back), or press one of the Tuning buttons to change the tuned frequency.

### 17. MONO

This button blends the two stereo channels together to produce monophonic sound. This blend minimizes rumble and surface noise in old monophonic records. Disengage the Mono mode for normal stereo listening

**NOTE:** If you are making a recording, engaging the MONO button may affect the signal being recorded—depending on whether one of the TAPE buttons is also engaged. If neither TAPE button is engaged, then pressing MONO will blend the input signal into mono, and the monophonic signal will be recorded. If one of the TAPE buttons is engaged, then pressing MONO will affect only the sound that you hear as it returns from the recorder: the signal going to the tape will be recorded in stereo.

The MONO button also disables the stereo FM circuits in the tuner. Normally the tuner receives monophonic transmissions in mono and automatically switches on its multiplex decoding circuits when a stereo FM broadcast is received (as shown by the FM STEREO Indicator). But when a very weak

FM stereo signal is received it may be excessively noisy because of the multiplex encoding technique used for stereo broadcasting. In that case, depress the MONO button to lock the tuner in the mono mode, in order to obtain consistently quieter and cleaner sound.

Remember to disengage the MONO button when you re-tune to a stronger signal. As long as the MONO button is engaged, no broadcasts can be received in stereo.

## 18. AM/FM SELECTOR

When the FM or AM button is pressed it switches the receiver to the tuner input and selects the FM or medium-wave AM band.

The tuning circuit has a "last station selected" memory. When you switch between tuning bands, the circuit automatically re-tunes the last station that you were tuned to when you previously used that band.

## 19. FM BLEND

The FM Blend circuit reduces noise in weak FM stereo signals by reducing the stereo separation.

It is characteristic of stereo FM that the stereo subcarrier becomes noisier as the received signal becomes weaker. When the Blend is engaged, the contribution of the stereo subcarrier to the sound is reduced, giving up some stereo separation in favor of quieter reception.

Remember to disengage the Blend for normal reception of strong signals.

## 20. TUNING DISPLAY

This display is in three parts: frequency, signal strength, and tuning

**FREQUENCY.** The numerical display shows the tuned frequency.

**SIGNAL STRENGTH.** The signal strength meter is a series of five bars. The number of illuminated bars increases with the strength of the received signal. If only one or two bars illuminate, the signal is too weak for noise-free reception in stereo, but reception may be satisfactory in mono. Strong signals are indicated by four or five illuminated bars.

**TUNING.** The center-tuning indicator (FM only) consists of an illuminated rectangular bar and two triangular pointers. The pointers glow when the tuning is within an FM station's channel but not at the center of that channel. The orientation of the illuminated pointer shows whether the tuning frequency should be increased or decreased. When the broadcast is accurately center-tuned, the triangular pointers fade out and only the middle bar is illuminated.

On the AM band, tune for maximum signal strength,

## 21. TUNING UP/DOWN

PRESS THE RIGHT-HAND BUTTON (▲) to tune toward higher frequencies, or the left-hand button (▼) to tune toward lower frequencies.

When a Tuning button is pressed momentarily, the tuned frequency shifts up or down by one step, unless the SEARCH mode has been engaged. (If SEARCH is engaged the tuner will scan in a station-by-station mode rather than in small tuning steps.)

In North America the size of the minimum tuning step is

0.05 MHz on FM, or 10 kHz on the AM band. In Europe and elsewhere the tuning step is 0.05 MHz on FM, or 9 kHz on AM. Each time a Tuning button is tapped, the tuned frequency will shift up or down by this increment, as shown on the digital frequency display.

If a Tuning button is held down with continuous pressure rather than just being tapped, the circuit pauses briefly and then scans rapidly up or down in frequency.

To tune a broadcast signal, press continuously on either Tuning button until the tuned frequency is close to the desired broadcast frequency. Then fine-tune in small increments by tapping a Tuning button. If you know the exact frequency of the broadcast station, simply tune to that frequency. If you don't know the exact frequency, tune to the vicinity of the correct frequency and then observe the signal strength and center-tune indicators while fine-tuning. For AM broadcasts, fine-tune to obtain maximum signal strength. On FM, fine-tune until the center-tune indicator is illuminated.

## 22. SEARCH MODE

When the SEARCH button is engaged, the tuner scans in a station-by-station mode rather than in small frequency increments. When either tuning button is pressed, the tuner scans rapidly up or down in frequency and automatically stops at the next station whose signal is strong enough for good reception. A muting circuit automatically silences the output during the scan, until the tuning circuits lock onto a station.

The manual tuning mode (with the SEARCH button OUT) partially overrides the scan muting. In this mode all stations (and the inter-station noise) remain audible at a reduced volume level while the tuning is being scanned up or down in frequency.

If you want to search for very weak signals, or if you need to fine-tune away from the center of a station's broadcast channel in order to cure an interference problem, use the manual tuning mode.

## A NOTE ON OVERLOAD PROTECTION

Because NAD amplifiers sound so clean and musical when driven beyond their nominal power ratings and when used to drive low-impedance loudspeakers, you may be tempted to stress this amplifier beyond its design capacity.

It can safely and cleanly drive impedances as low as 2 ohms with wide-range musical signals whose peak level is 50 watts or more, but it may overheat if called upon to deliver high power continuously into a low impedance.

Thus you may play music at volume levels which cause the brief transient peaks and climaxes in music to exceed the amplifier's rated power by a considerable margin (and with Soft Clipping the music will continue to sound good at those high peak levels). But if you overdrive the amplifier continuously, rather than only on brief musical peaks, the output transistors may overheat.

Should this happen, a thermal sensor will activate a muting circuit, greatly reducing the sound level, and the soft clip/protection LED will glow red.

Overheating is particularly likely if you set the SPEAKER IMPEDANCE switch to 8 OHMS and then try to drive very low impedances at high volume levels. Severe abuse of this type could cause internal fuses to blow in order to protect the amplifier. These fuses are not intended to be replaced by the

user; if the receiver shuts down you should return it for service.

If this occurs, you should examine whether a pattern of unintended abuse may have contributed to the failure. For example you may have a loose strand of speaker wire causing a partial short-circuit either at the speakers or at the receiver speaker terminals. The impedance of your speakers may be lower than you think; if you are not sure, set the SPEAKER IMPEDANCE switch to 4 OHMS. You may be combining maximum bass boost with high volume settings. Or you may simply be playing the music at continuously high power levels that demand a larger amplifier with higher-power transistors and bigger heat-sinks.

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## IN CASE OF DIFFICULTY: A TROUBLE-SHOOTING GUIDE

SYMPTOM	POSSIBLE CAUSE	SYMPTOM	POSSIBLE CAUSE	
<b>No sound.</b>	Power not turned on. Line cord unplugged, or- plugged into dead outlet. (To check AC outlet, plug in an electric lamp.)	<b>Pre-Out/Normal-In jumper pulled out, missing, or making contact with any metal object.</b>	Connecting cable pulled loose or making poor contact in socket. Rotate plugs in sockets to restore contact.	
	AM or FM selected but tuned to a blank frequency between stations. Inoperative input selected (eg. CD input selected with no CD playing).		Short-circuit in a defective connecting cable. Wiggle all cables, especially where they enter plugs.	
	Tape 1 or Tape 2 selected with no tape playing.		Dirty contact in a switch. Exercise all front-panel switches to restore clean wiping contact.	
	Speaker selector OFF (both buttons OUT).			
	Speakers "B" engaged when speakers are connected only to the "A" terminals.		<b>Loud buzz and hum.</b>	Connecting cable pulled partially out of its socket.
	Protection relay has operated to protect the amplifier from short-circuited speaker wires or from overheating caused by overdriving the amplifier into a low impedance with the impedance selector at 8 ohms. (To re-set protection relay, switch Power off and allow amplifier to cool.)			Defective connecting cable.
AC power line fuse blown. Internal fuses blown; return amplifier to dealer for service		<b>Low-frequency hum in phono.</b>	Turntable grounding wire not connected. Ground-loop hum. Install polarized AC plugs properly in polarized wall sockets (in which one slot is longer than the other). Try reversing any non-polarized plugs in their sockets, to find the orientation that yields the least hum.	
<b>No sound in one channel.</b>	Balance control set at full-left or full-right.		Turntable located too close to the receiver (especially to its left). Locate the turntable to the right of the receiver.	
	Loudspeaker connecting wire pulled loose (check all connections, both at speakers and at the receiver).		Phono cables routed too close to the receiver's power transformer (at left-rear) Phono plugs making poor contact in socket. (Also check any phono plugs in the turntable base.)	

<b>SYMPTOM</b>	<b>POSSIBLE CAUSE</b>
<b>Hum in tape playback.</b>	Tape deck located too close to receiver (directly above or below).
	Tape deck located too close to television set.
	Plugs making poor contact in sockets.

<b>Distorted reception of FM stations.</b>	"Multipath" reception. Rotate antenna to find the orientation that provides best reception. (The best orientation may vary from station to station.) Raise the height of the antenna. If your building has steel-frame or steel-reinforced concrete construction, move your FM 75-ohm coaxial lead-in cable.  If all else fails, switch to Mono reception.
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<b>SYMPTOM</b>	<b>POSSIBLE CAUSE</b>
<b>Whistle or buzz in AM or FM.</b>	Video game, computer, or computerized game operating nearby.
	AM only: static due to electric motors or fluorescent lights. Minimize by tuning to a strong station, or install a long wire antenna.

<b>Weak bass, diffuse stereo imaging.</b>	Speakers wired out of phase. Swap connections at the back of ONE speaker.
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