



1130

PREAMPLIFIER

**PREAMPLIFICATEUR
STEREO**

STEREO

VORVERSTÄRKER

**INSTRUCTIONS
FOR INSTALLATION
AND OPERATION**

**MANUEL
D'INSTALLATION
ET D'UTILISATION**

BEDIENUNGSANLEITUNG

REAR PANEL

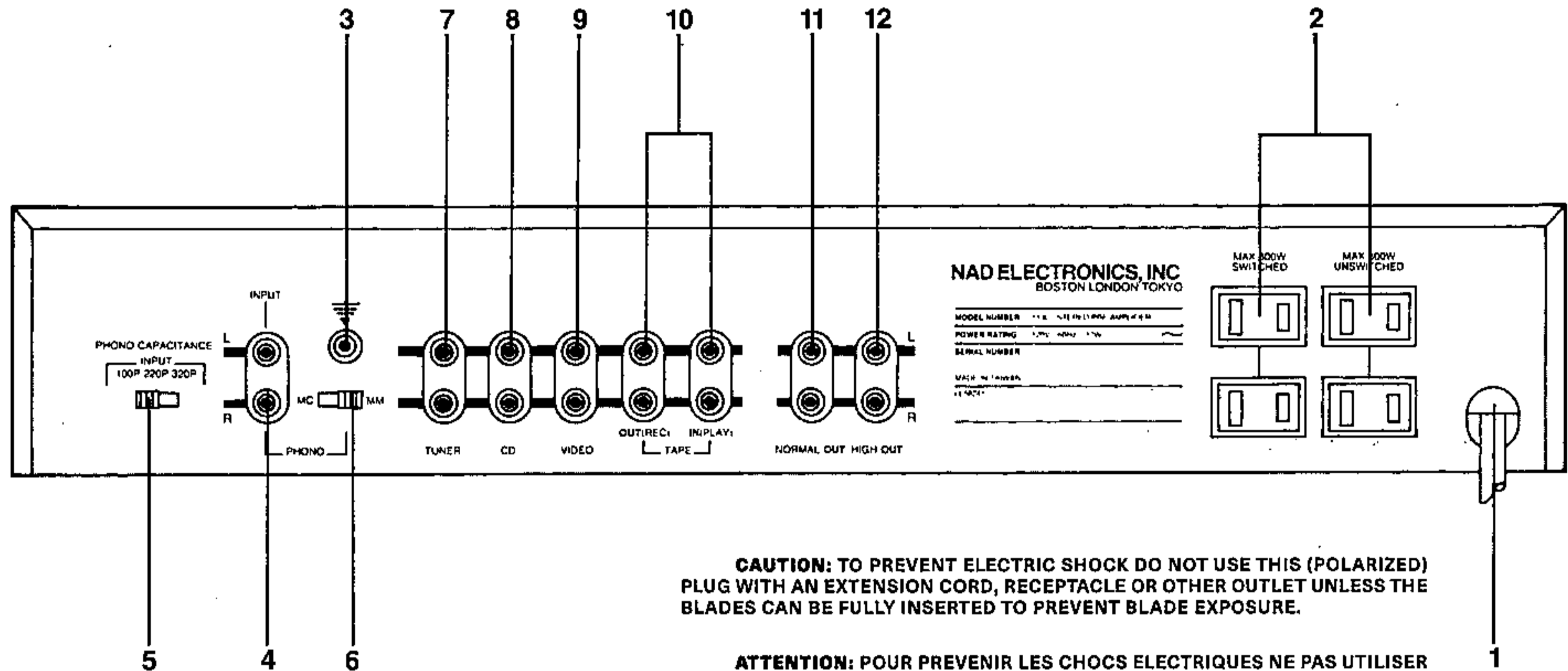
- 1. AC Line Cord.
- 2. AC Convenience Outlets.
- 3. Phono Ground.
- 4. Phono Input.
- 5. Capacitance Selector.
- 6. MM/MC Selector.
- 7. Tuner Input.
- 8. CD Input.
- 9. Video Input.
- 10. Tape Rec Play.
- 11. Preamp Output (Normal)
- 12. Preamp Output (High Level)

LE PANNEAU ARRIERE

- 1. Cordon d'alimentation.
- 2. Prises CA.
- 3. Masse phonoclecteur.
- 4. Entrée phono.
- 5. Sélecteur de capacitance.
- 6. Sélecteur de phonoclecteur.
- 7. Entrée tuner.
- 8. Entrée de lecteur de disque compact.
- 9. Entrée vidéo.
- 10. Entrée Sortie magnétophone.
- 11. Sortie de préamplification (normale).
- 12. Sortie de préamplification (haut niveau).

RÜCKSEITE

- 1. Netzkabel.
- 2. Sekundär-Steckdosen.
- 3. Masseanschluß für Plattenspieler.
- 4. Plattenspieler-Eingang.
- 5. Kapazitäts-Wahlschalter.
- 6. MM/MC Umschalter.
- 7. Tuner-Eingang.
- 8. CD-Eingang.
- 9. Video Eingang.
- 10. Tonbandgerät Eingang Ausgang.
- 11. Normaler Vorverstärker-Ausgang.
- 12. Hochpegeliger Vorverstärker-Ausgang.



CAUTION: TO PREVENT ELECTRIC SHOCK DO NOT USE THIS (POLARIZED) PLUG WITH AN EXTENSION CORD, RECEPTACLE OR OTHER OUTLET UNLESS THE BLADES CAN BE FULLY INSERTED TO PREVENT BLADE EXPOSURE.

ATTENTION: POUR PREVENIR LES CHOCs ELECTRIQUES NE PAS UTILISER CETTE FICHE POLARISEE AVEC UN PROLONGATEUR, UNE PRISE DE COURANT OU UNE AUTRE SORTIE DE COURANT, SAUF SI LES LAMES PEUVENT ETRE INSEREES A FOND SANS LAISSER AUCUNE PARTIE A DECOUVERT.

FRONT PANEL

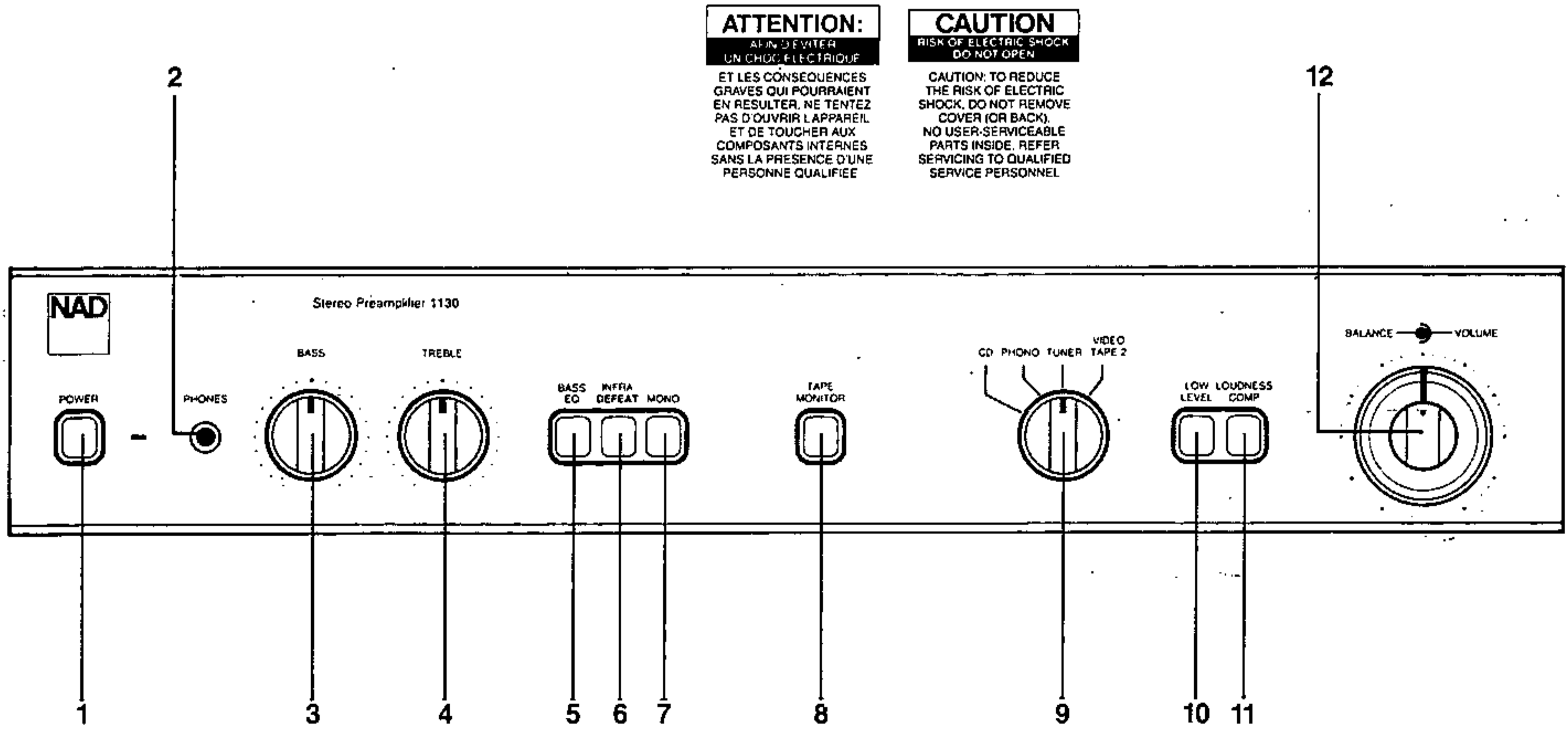
- 1. Power.
- 2. Phones.
- 3. Bass.
- 4. Treble.
- 5. Bass EQ.
- 6. Infrasonic Filter Defeat.
- 7. Mono.
- 8. Tape Monitor.
- 9. Input Selector.
- 10. Low Level.
- 11. Loudness Compensation.
- 12. Volume Balance.

LE PANNEAU AVANT

- 1. Alimentation.
- 2. Casque d'écoute.
- 3. Graves.
- 4. Aigus.
- 5. Bass Eq.
- 6. Filtre infrasonique.
- 7. Mono.
- 8. Commutateur de surveillance de bande.
- 9. Sélecteur d'entrée.
- 10. « Low level ».
- 11. Commutateur de contour sonore.
- 12. Volume Equilibrage.

FRONTSEITE

- 1. Netzschalter.
- 2. Kopfhörer-Anschluß.
- 3. Baßsteller.
- 4. Höhensteller.
- 5. Baß Equalizer-Schalter.
- 6. Schalter für Infraschall-Filler.
- 7. Mono Stereo-Schalter.
- 8. Vor Über Band-Schalter.
- 9. Eingangswahlschalter.
- 10. Schalter für Lautstärkeabsenkung.
- 11. Gehörliche Lautstärke-Einstellung.
- 12. Lautstärke Balance-Steller.



ATTENTION:
AFIN D'EVITER UN CHOC ELECTRIQUE ET LES CONSEQUENCES GRAVES QUI POURRAIENT EN RESULTER, NE TENTEZ PAS D'OUVRIR L'APPAREIL ET DE TOUCHER AUX COMPOSANTS INTERNES SANS LA PRESENCE D'UNE PERSONNE QUALIFIEE

CAUTION:
RISK OF ELECTRIC SHOCK DO NOT OPEN
CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK). NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL

ENGLISH**REAR PANEL CONNECTIONS****1. AC LINE CORD**

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

2. AC OUTLETS (not in U.K. model)

The AC power line cords of other stereo components may be plugged into these accessory outlets. The SWITCHED outlets are intended for all-electronic products (power amp, tuner, equalizer, or other signal processor); and will be switched on and off by the main POWER button. The UNSWITCHED outlets should be used to power products involving mechanical operations (e.g. a turntable, CD player, or tape deck); such products should be switched on and off with their own power switches.

The UNSWITCHED outlets can also be used to power any device containing a clock timer, or a digital tuner that requires uninterrupted AC power to maintain station tuning information stored in its memory.

The SWITCHED outlets can be used with a power amplifier that has a rated output of 150 watts/channel or less. A larger power amplifier, or one with a three-wire power cord, should be plugged directly into a wall outlet and should be turned on and off via its own Power switch.

3. 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.

4. 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 for 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.

5. CAPACITANCE SELECTOR

This switch selects the input capacitance of the phono preamplifier. It enables you to optimise the load capacitance for those cartridges whose frequency response is affected by this parameter.

If you are using a low-inductance pickup (such as a Grado or Micro-Acoustics), or a moving-coil cartridge, then

the setting of the CAPACITANCE selector is unimportant. But with many high-inductance magnetic pickups the capacitance setting will audibly alter the sound of the pickup.

In order to select the best value of preamp input capacitance you must first determine the total capacitance recommended for the cartridge. This usually will be included in the maker's specifications, and it may also be mentioned in magazine reviews of the cartridge.

Next, subtract the capacitance of your turntable's tone-arm wiring and signal cables. (Check the specifications supplied with the tonearm, or write to the manufacturer of the tonearm, or as a last resort assume a typical value of 150 pF.) After this subtraction, what remains is the desired value of preamp input capacitance. Set the CAPACITANCE selector to the nearest value. It is not necessary to match the computed value exactly; with most phono pickups a variation of 50 pF one way or the other will produce only a very slight change in frequency response.

Example: suppose you are using a Stanton 881S pickup cartridge in a Pioneer turntable. Stanton specifies a recommended load capacitance of 275 pF for the cartridge, and the Pioneer turntable has a cable capacitance of about 100 pF. Subtracting: 275 minus 100 equals 175 pF, so you should set the CAPACITANCE selector to the nearest value, 200 pF.

If you prefer, you may simply set the CAPACITANCE selector by ear while listening to recordings that are strong in high-frequency overtones. Typically, when the capacitance is too low the upper-midrange (the soprano voice range) will be softened and the response at the highest frequencies will be peaky, leading to edgy violin tone and increased surface noise. Too high a value of capacitance will bring the upper-midrange forward while rolling off the extreme highs.

6. MM/MC SELECTOR

This 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 pickups, i.e., those with a rated output of 1.0 mV or greater. If your cartridge is a low-output moving-coil pickup (with a rated output of less than 1.0 mV), 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.

7. TUNER INPUT

Connect the audio signal cable from an AM/FM (or video) tuner to this pair of jacks.

8. CD INPUT

Connect the audio signal cables from a digital Compact Disc player to these jacks. The input signal will be fed to the Volume control before reaching any active circuitry, so the



The lightning flash with arrowhead, within an equilateral triangle, is intended to alert the user of the presence of uninsulated "dangerous voltage" within the product's enclosure; that may be of sufficient magnitude to constitute a risk of electric shock to persons.



The exclamation point within an equilateral triangle is intended to alert the user of the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

amplifier's circuits cannot be overloaded by high-level signals from the digital player.

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.

9. VIDEO INPUT

These auxiliary jacks are for any "line level" signal source, such as a spare tape deck, the audio line output from a videocassette or videodisc player, or a television sound tuner.

10. TAPE REC/PLAY

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 amplifier's TAPE OUT (REC) 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 amplifier's TAPE IN (PLAY) jacks.

The TAPE REC/PLAY jacks may be used for connecting a signal processing accessory instead of a tape recorder. Examples of such accessories include a dynamic range processor, a dynamic noise filter, a DBX disc decoder, or any other device whose operation depends on the setting of a signal threshold. Connect a patch cord from the TAPE OUT (REC) jacks to the processor's inputs, and another patch cord from the processor's outputs to the TAPE IN (PLAY) 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 Preamp Out jacks. The choice is a matter of convenience.

11. PREAMP OUTPUT (NORMAL)

This is the normal output from the preamplifier. Connect a stereo signal cable from these jacks to the main input jacks on your power amplifier.

If you have an equalizer, ambience-reproduction unit, or other signal processor that needs to be installed in the signal path, connect a cable from the NORMAL output jacks to the input of the processor, and a second cable from the output of the processor to the main input of your power amplifier.

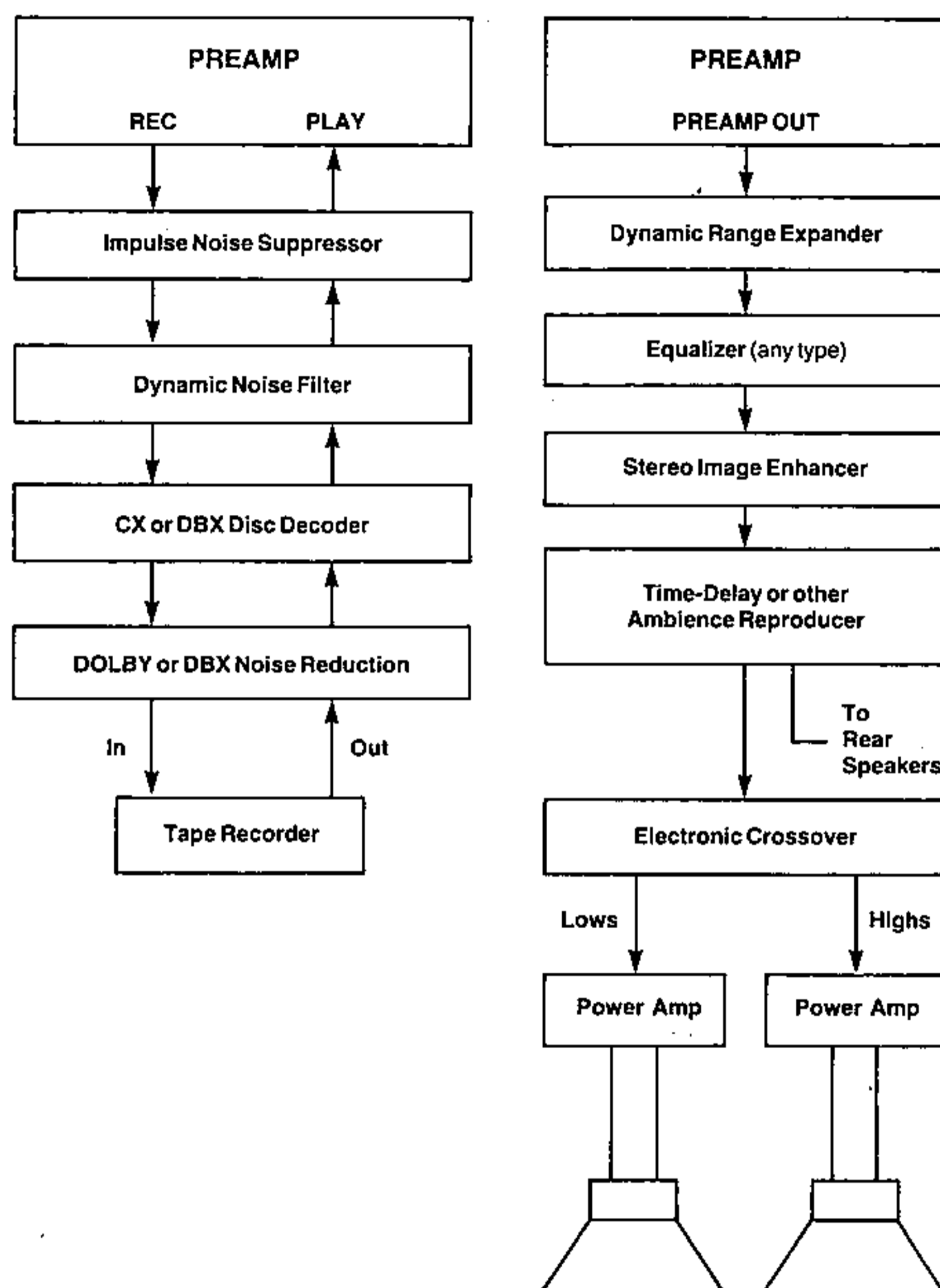
The preamp has a low output impedance (600 ohms). It can drive several amplifiers connected in parallel, and it can be used with long signal cables in order to drive power amplifiers that are located near the speakers (or "powered" speakers having built-in power amplifiers).

12. PREAMP OUTPUT (HIGH LEVEL)

At this special preamp output the signal level is approximately 13 dB higher than at the normal output, and the output impedance is lower (220 ohms). You may use these jacks if your power amplifier requires an input level of more than 2 volts to drive it to full output. The High-level output jacks also may be used to drive professional studio equipment; from these jacks the preamp can drive load impedances as low as 600 ohms and can deliver undistorted signals up to 15 volts (+26 dBm) to a high-impedance (bridging) load.

PROCESSOR CHAINING

Today's stereo systems often consist not only of the basic elements (turntable, tuner, tape deck, amplifier and speakers) but also of assorted signal-processing accessories which often exceed in number the available places in the circuit where they can be connected. It then becomes necessary to connect two or more processors in series in a single processing chain, either in a "tape monitor" loop or between the preamp and power amp, and it may not be obvious how the various processors should be chained for best results. The following sketches outline a suggested order for processor chaining, either in a tape-monitor loop or between preamp and power amp.



It is assumed that each processor in the TAPE REC/PLAY chain has its own set of "TAPE" input/output jacks, to which the next processor in the chain is connected. Each unit in the PREAMP OUT chain is assumed to have an "off" or "bypass" mode which allows signals to pass through without processing when desired.

The outline shown here is not the only practical ordering of equipment; you could, for instance, have an equalizer in the TAPE REC/PLAY loop, at approximately the same position in the chain as the dynamic noise filter. And the ordering of the dynamic expander, equalizer, and stereo image enhancer in the PREAMP OUT chain is arbitrary.

FRONT PANEL CONTROLS

1. POWER

Depress this button to switch on the pre-amplifier and any equipment plugged into the SWITCHED convenience outlet on the rear panel. To switch the power off, depress the button again and release it.

If you prefer, you may leave the POWER switch permanently engaged and use an external switch (such as a clock timer) to turn the power on and off.

The preamplifier is equipped with a turn-on delay that automatically mutes the preamp outputs for several seconds, until the the preamp's circuits are fully stabilized. This prevents the transmission of turn-on transients to the power amplifier. The same circuit mutes the outputs instantly when the power is switched off.

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 your power amplifier.

Insertion of a plug into the PHONES socket automatically mutes the signal at the normal PREAMP OUTPUT jacks, thus shutting off the loudspeakers. In order to resume listening to loudspeakers you must unplug the headphones from the PHONES socket.

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. BASS

The Bass control adjusts the relative level of the low 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 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.

4. 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.

5. BASS EQ.

This circuit boosts the lowest bass frequencies, those below 60 Hz. In virtually all loudspeakers the useful output rolls off at frequencies below the woofer/cabinet resonance (which typically occurs between 40 and 70 Hz). 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 25 Hz 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.

6. INFRASONIC FILTER DEFEAT

The output from a record player usually contains strong but inaudible impulses at infrasonic frequencies (below 20 Hz) due to disc warps, stylus/tonarm resonance, and vibrations reaching the turntable. If these are amplified at full strength, they may waste amplifier power and produce excessive woofer cone excursions, muddying the sound.

The infrasonic filter attenuates these unwanted signals. The filter is normally in-circuit (with the button OUT), and it is especially desirable to have it in-circuit when a large low-frequency boost is being applied via the BASS control.

If you want to bypass the infrasonic filter, depress the INFRA DEFEAT button. As long as the button is OUT, the filter is active.

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 INFRA DEFEAT button.

7. MONO

This button blends the two stereo channels together to produce monophonic sound. This blend minimizes rumble and surface noise in old monophonic records. The button must be OUT for normal stereo listening.

8. TAPE MONITOR

When this button is pressed it lets you hear the playback signal from your tape recorder (or any other device connected to the TAPE IN (PLAY) jacks on the rear panel). If you have a signal-processing accessory (such as a graphic equalizer or dynamic expander) connected to the TAPE jacks, pressing TAPE MONITOR allows you to hear the processed signal.

The TAPE MONITOR button affects only what you hear, not what is being recorded. The program source chosen by the INPUT SELECTOR is always fed to the REC jacks for recording or processing, regardless of any other controls.

CAUTION: If you have nothing connected to the TAPE REC/PLAY jacks, or have a tape deck connected but not running, then when you press TAPE MONITOR you will hear nothing but silence—regardless of what other buttons you may press! To disengage the TAPE MONITOR circuit and restore the normal signal path, press the TAPE MONITOR button again and release it.

The standard purpose of the TAPE MONITOR is to allow you to listen to recorded tapes, and also to check on tape recordings as they are being made. If you have a three-head tape deck that allows off-the-tape monitoring during recording, engaging the TAPE MONITOR switches on both the amplifier and the tape deck will let you hear the playback signal from the tape immediately after it is recorded, so that you can check on its quality.

To make tape recordings on a recorder attached to the TAPE REC/PLAY jacks, simply use the INPUT SELECTOR switch to select the program source that you want to record from (CD, PHONO, TUNER, etc.). The recording will not be affected by any control but the INPUT SELECTOR; thus you may vary the volume and tone controls, the TAPE MONITOR switch, etc., without altering the recording that is being made.

COPYING TAPES: If you want to copy a recording from one tape deck to another, connect the "copying" or "dubbing" recorder (with a blank tape) to the TAPE REC/PLAY jacks. Connect the playback cable from the "source" deck (the machine containing the tape to be copied) to the Video input jacks. Select Video on the INPUT SELECTOR switch in order to hear the source tape and feed its signal to the copying recorder. If you then press the TAPE MONITOR button, you will hear the signal after it has passed through the copying recorder's electronics.

If you need greater flexibility in connecting and copying among multiple tape decks, purchase an inexpensive switch-box, connect it to the TAPE REC/PLAY jacks, and connect the tape decks to the switch-box. (Example: the Radio Shack #42-2105 switch-box contains switches for monitoring and copying among three tape decks.)

9. INPUT SELECTOR

This switch selects the input signal. The selected input signal will be heard through the loudspeakers or headphones as long as the TAPE MONITOR button is disengaged. The selected input signal will also be fed out through the TAPE OUT (REC) jacks for tape recording or signal processing.

10. 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 (REC) 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.

11. 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.

12. VOLUME/BALANCE

The knurled outer ring of this two-section knob is the Volume control, which adjusts the overall loudness of the sound. The control is designed for accurate tracking of the two channels, so that the stereo balance will not shift noticeably as the Volume control setting is varied.

The center section of the dual knob is the Balance control, which adjusts the relative levels of the left and right

channels. A detent at the 12 o'clock position marks the point of equal balance. Rotation of the knob 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 knob to the left shifts the sonic image toward the left speaker.

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 the speakers.

Ideally the detented center position of the Balance control would be its normal setting. But several common circumstances may cause an unequal balance between the channels, requiring a compensatory off-center setting of the Balance control to restore the most uniform spread of stereo sound between the speakers. Examples 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.

These controls do not affect the signals fed to the TAPE REcording jacks.

IN CASE OF DIFFICULTY: A TROUBLE-SHOOTING GUIDE

SYMPTOM	POSSIBLE CAUSE
No sound.	Power not on. Line cord unplugged. Tuner selected but tuned to a blank frequency between stations. Video input selected with no video (or other auxiliary source) playing. Tape Monitor engaged with no tape playing. Headphone plug in PHONES socket. (Sound will appear in headphones only. Unplug phones to restore sound via speakers.)
No sound in one channel.	Balance control turned full-left or full-right. Connecting cable pulled loose or making poor contact in socket. Rotate plugs in sockets to restore contact. Broken wire in a connecting cable. Wiggle all cables, especially where they enter plugs. Dirty contact in a switch. Exercise all front-panel switches to restore clean wiping contact.

SYMPTOM	POSSIBLE CAUSE
Low-frequency hum in phono.	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. Turntable located too close to the amplifier (especially to its left). Locate the turntable to the right of the amplifier. Phono cables routed too close to the amplifier's power transformer (at left-rear). Phono plugs making poor contact in socket. (Also check any phono plugs in the turntable base.)
Hum in tape playback.	Tape deck located too close to amplifier (directly above or below). Tape deck located too close to television set. Plugs making poor contact in sockets.
Weak bass; diffuse stereo imaging.	Speakers wired out of phase. Swap connections at the back of ONE speaker. Very weak or no bass may be caused by a defective (burnt-out or blown) woofer.