

NAD

1155

**STEREO
PREAMPLIFIER
PREAMPLIFICATEUR
STEREO
STEREO
VORVERSTÄRKER**

THIS IS A COPY TO KEEP
IT MUST NOT BE TAKEN OUT
FROM FILE WITHOUT PERMISSION.

**INSTRUCTIONS
FOR INSTALLATION
AND OPERATION
MANUEL
D'INSTALLATION
ET D'UTILISATION
BEDIENUNGSANLEITUNG**

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 PRÉVENIR LES CHOCS ÉLECTRIQUES NE PAS UTILISER CETTE FICHE POLARISÉE AVEC UN PROLONGATEUR, UNE PRISE DE COURANT OU UNE AUTRE SORTIE DE COURANT, SAUF SI LES LAMES PEUVENT ÊTRE INSÉRÉES À FOND SANS EN LAISSER AUCUNE PARTIE À DÉCOUVERT.

NOTE: Some NAD components are equipped with dual or multi-voltage transformers (which is indicated on the back panel). If you wish to change the voltage, please bring your unit to an authorized NAD service technician for internal conversion.

ATTENTION: Quelques pièces NAD sont munies de transformateurs à double ou à multi-voltage (indiqué au panneau arrière). Si vous voulez changer le voltage, veuillez apporter votre appareil au fournisseur de NAD pour le transformer.

ZUR BEACHTUNG: Einige NAD Geräte sind mit Umschaltern für unterschiedliche Eingangsspannungen ausgerüstet (Ein Vermerk auf der Rückseite weist darauf hin). Aptierung, wenn notwendig, muß von einem qualifizierten Techniker in einer NAD Servicestation vorgenommen werden.

REAR PANEL

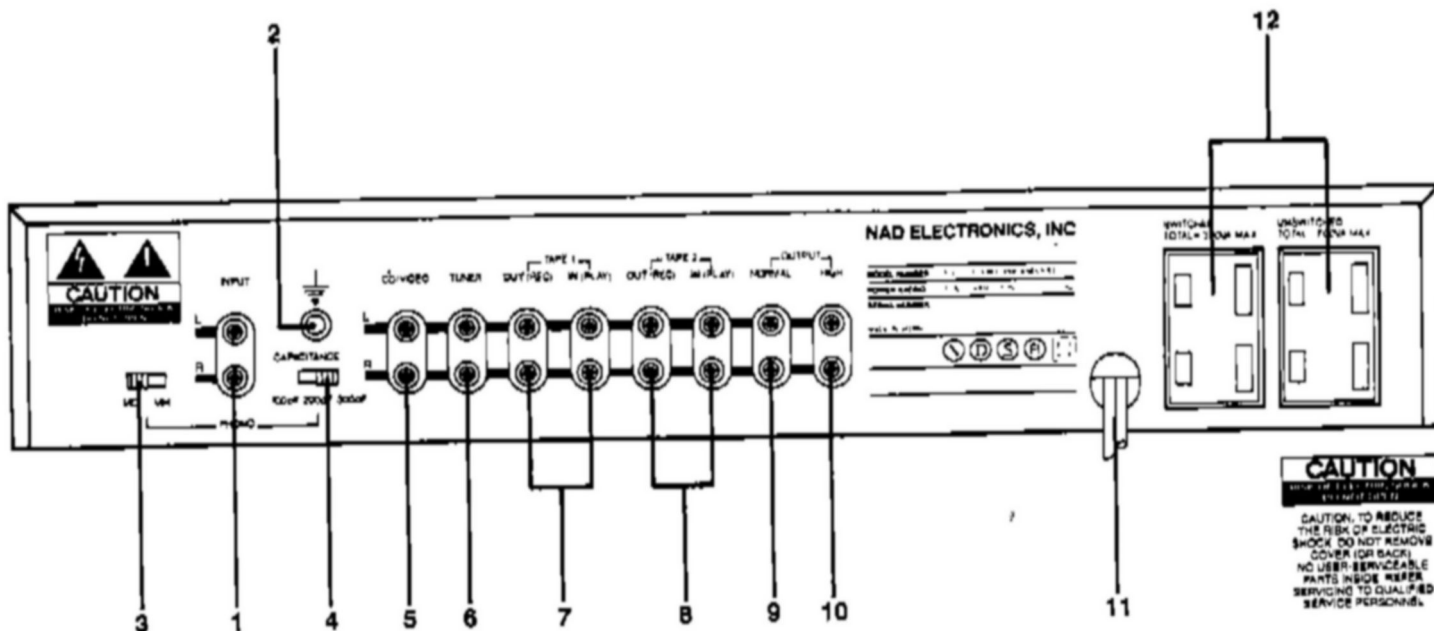
- 1. Phono Input
- 2. Phono Output
- 3. MM MC Selector
- 4. Phono Capacitance
- 5. CD Video Input
- 6. Tuner Input
- 7. Tape 1 Rec Play
- 8. Tape 2 Rec Play
- 9. Presamp Output (Normal)
- 10. Presamp Output (High Level)
- 11. AC Line Cord
- 12. AC Outlet

LE PANNEAU ARRIERE

- 1. Entrée phono
- 2. Masse phonostère
- 3. Sélecteur de phonostère
- 4. Sélecteur de capacitance
- 5. Entrée lecteur de disque compact auxiliaire
- 6. Entrée tuner
- 7. Entrée sortie magnétophone 1
- 8. Entrée sortie magnétophone 2
- 9. Sortie de pré-amplification (normal)
- 10. Sortie de pré-amp (haut niveau)
- 11. Cordon d'alimentation
- 12. Prises CA

RÜCKSEITE

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



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

ATTENTION!
 ET LES CONSÉQUENCES GRAVES QUI POURRAIENT EN RÉSULTER, NE TENTÉZ PAS D'OUVRIR L'APPAREIL ET DE TOUCHER AUCUN COMPOSANT INTERNE SANS LA PRÉSENCE D'UNE PERSONNE QUALIFIÉE.

FRONT PANEL

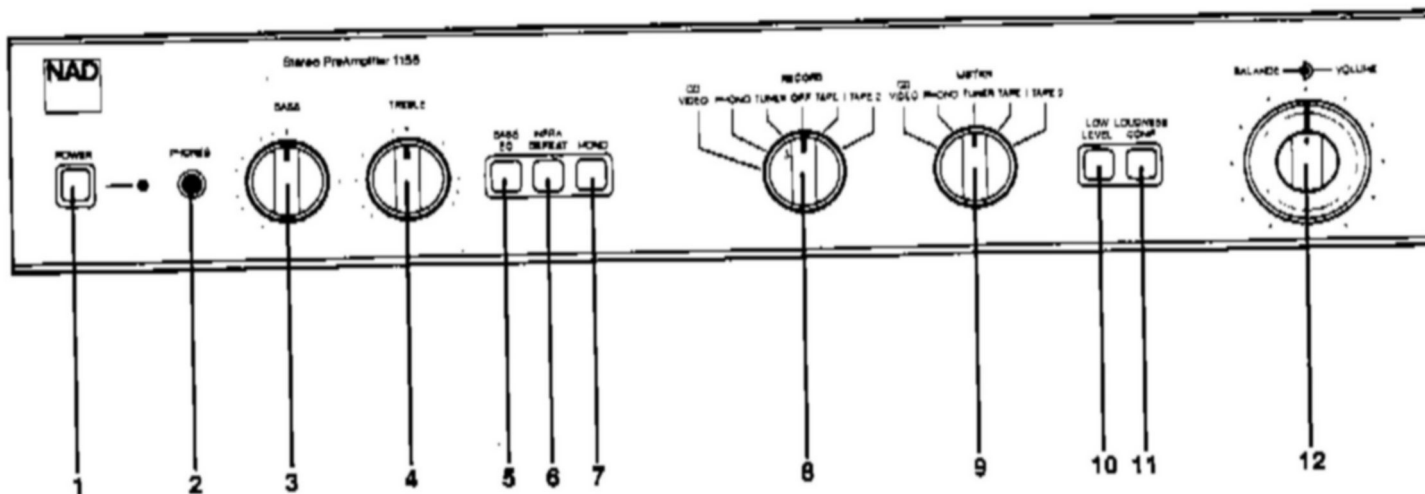
- 1. Power
- 2. Phono
- 3. Bass
- 4. Treble
- 5. Bass EQ
- 6. Infrasonic Filter Defeat
- 7. Mono
- 8. Recording Input Selector
- 9. Listen Input Selector
- 10. Low Level
- 11. Loudness Compensation
- 12. Volume Balance

LE PANNEAU AVANT

- 1. Alimentation
- 2. Casque d'écoute
- 3. Grave
- 4. Aiguë
- 5. Bass EQ
- 6. Filtre infrasonique
- 7. Mono
- 8. Sélecteur de source d'enregistrement
- 9. Sélecteur de source de lecture
- 10. - Low level -
- 11. Commutateur de contour sonore
- 12. Volume équilibrage

FRONTSEITE

- 1. Netzschalter
- 2. Kopfhörer-Anschluss
- 3. Bassfilter
- 4. Hochfilter
- 5. Bass Equalizer-Schalter
- 6. Schalter für Infrasonfilter
- 7. Mono-Steuer-Schalter
- 8. Aufnahme-Wahlschalter
- 9. Wiedergabe-Wahlschalter
- 10. Schalter für Lautstärkebeeinkung
- 11. Gehörnichtige Lautstärke-Einstellung
- 12. Lautstärke Balance-Steller



ENGLISH

REAR PANEL CONNECTIONS

1. 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.

2. 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. In some cases reversing the orientation of the AC power plug in the wall socket may yield a reduction in hum level.

3. 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.

4. PHONO CAPACITANCE

This switch selects the input capacitance of the phono preamplifier. It enables you to optimize 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 160 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.

5. CD/VIDEO 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 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 may be connected here, such as a spare tape deck, the audio line output from a videocassette or videodisc player, or a television sound tuner.

On this product the upper jack in each pair is for the Left channel, and the lower jack is for the Right channel.

6. TUNER INPUT

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

7. 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 amplifier's TAPE 1 output (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 1 input (PLAY) jacks.

8. TAPE 2 INPUT/OUTPUT

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



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.

Connect a patch cord from the TAPE 2 output (REC) jacks to the processor's inputs, and another patch cord from processor's outputs to the TAPE 2 input (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 PRE-OUT jacks. The choice is a matter of convenience.

9. 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).

10. PREAMP OUTPUT (HIGH LEVEL)

At this special preamp output the signal level is 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.

11. AC LINE CORD

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

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

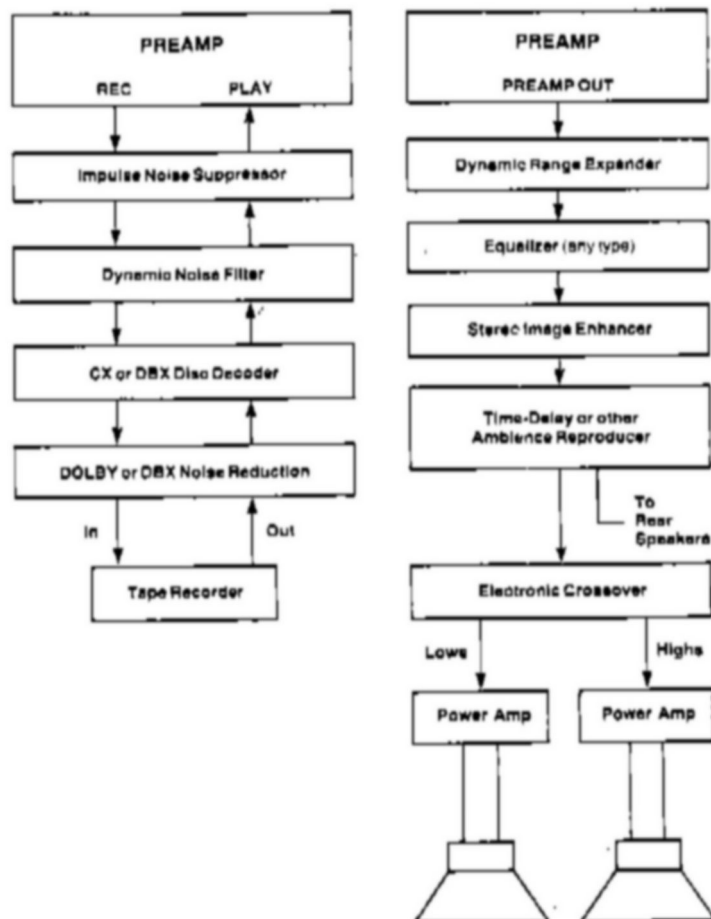
The AC power line cords of other stereo components may be plugged into these accessory outlets. The SWITCHED outlets are intended for all-electronic products (power amp, tuner, equalizer, or other signal processor), and will be switched on and off by the main POWER button. The UNSWITCHED outlets should 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.

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 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.

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. RECORD

This switch selects the input signal that will be fed out to the RECord jacks on the rear panel for tape recording or signal processing. The selected signal is fed to both TAPE 1 and TAPE 2 and may be recorded simultaneously on two tape machines.

The RECORD selector operates independently of the LISTEN selector; thus you can record from one program source while listening to a different signal source. You can record from the TUNER input while listening to PHONO (or vice-versa), or you can copy recordings from one tape deck onto a second recorder while listening to either tape machine or any other input.

The general rule is that you should always set the RECORD selector to the program source that you want to record from, while setting the LISTEN selector to the input that you want to hear.

In order to dub (copy) tapes from TAPE 1 onto TAPE 2, simply set the RECORD selector to TAPE 1. The playback signal from the TAPE 1 recorder will be fed to the TAPE 2 REC jacks for recording. Then you can set the LISTEN selector to TAPE 1 (to hear the source tape), or to TAPE 2 (in order to monitor the output of the copying recorder). Or you can set the LISTEN selector to PHONO, TUNER, or another input if you want to listen to something else while the copying proceeds. Changing the setting of the LISTEN selector has no effect on the signal fed to the tape recorder by the RECORD selector switch.

Similarly, tapes can be copied from TAPE 2 back to TAPE 1 simply by setting the RECORD selector to TAPE 2. Then set the LISTEN selector to TAPE 2 to hear the original tape, or to TAPE 1 to monitor the output of the copying recorder.

Using a signal processor. If you have a signal processor (such as an equalizer or a DBX unit) connected to the TAPE 2 REC/PLAY jacks, you can use it to process the playback signal from any program source by setting the RECORD selector to the program source that you want to hear. Then set the LISTEN selector to the same input to hear the unprocessed signal, or to TAPE 2 to hear the processed signal.

For example, if you have a DBX decoder connected to the TAPE 2 jacks, you can use it to decode DBX-encoded records by setting the RECORD selector to PHONO. This will feed the preamplified phono signal through the decoder via the TAPE 2 REC/PLAY jacks. Then set the LISTEN selector to TAPE 2 to hear the decoded signal.

If you want to use an equalizer, DBX encoder, or other device to process a signal *before* recording it, you must disconnect the tape recorder from the amplifier's REC/PLAY jacks. Connect only the processor to the amplifier's REC/PLAY jacks (either TAPE 1 or TAPE 2), and connect the tape recorder to the processor's own TAPE record/play jacks.

9. LISTEN

This rotary switch selects the signal that you will hear.

If you have a three-head tape recorder and wish to monitor its playback output while a recording is being made, use the RECORD selector to select the desired input signal and feed it to the recorder. Then set the LISTEN selector to TAPE 1 or TAPE 2 (as appropriate) to hear the monitor output from the recorder.

Similarly, if you have a signal processor connected to the TAPE 2 jacks and want to hear the processed signal, first use the RECORD selector to choose the desired input signal and feed it to the processor. Then set the LISTEN selector to TAPE 2 to hear the processed signal.

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.



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**STEREO
PREAMPLIFIER**

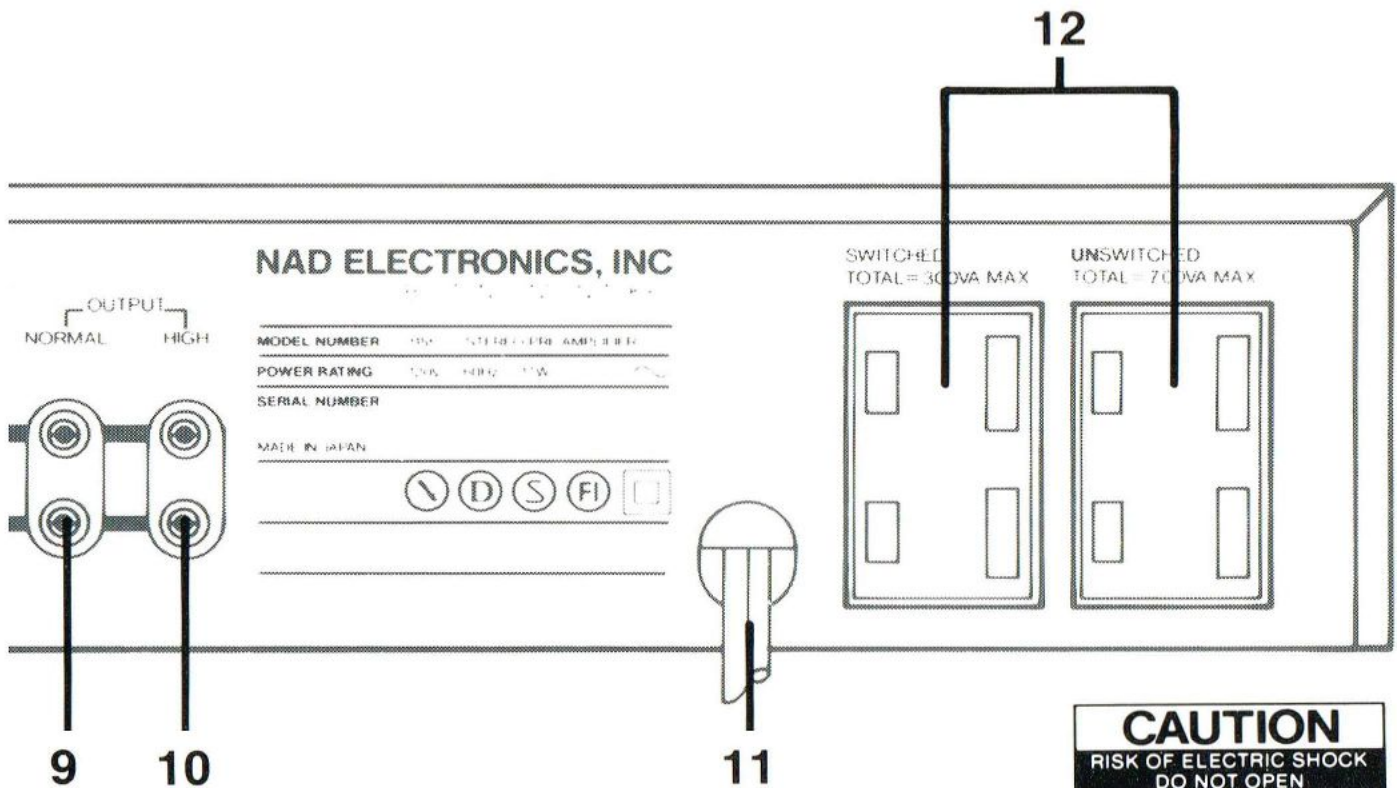
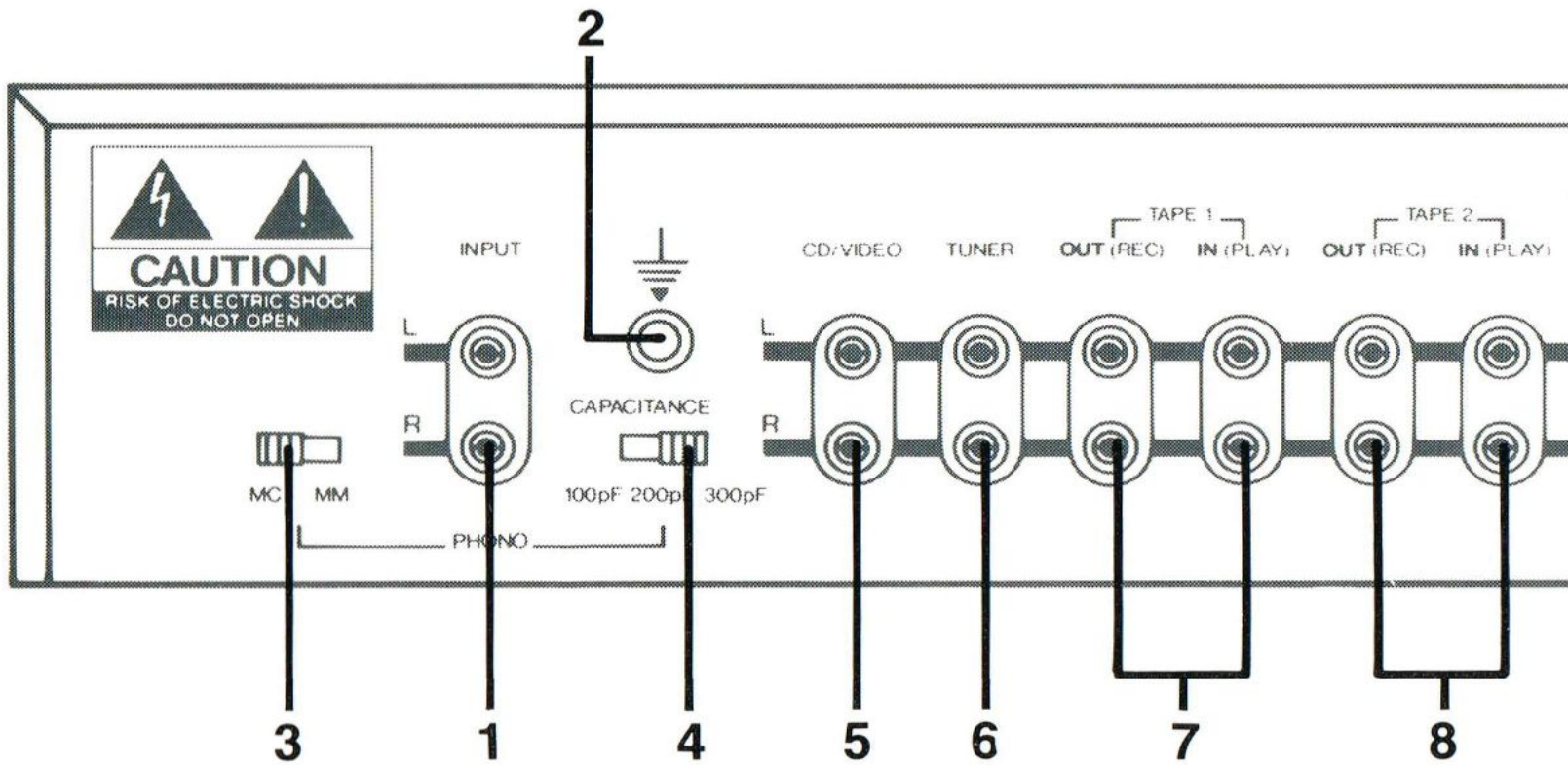
**INSTRUCTIONS
FOR INSTALLATION
AND OPERATION**

REAR PANEL

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

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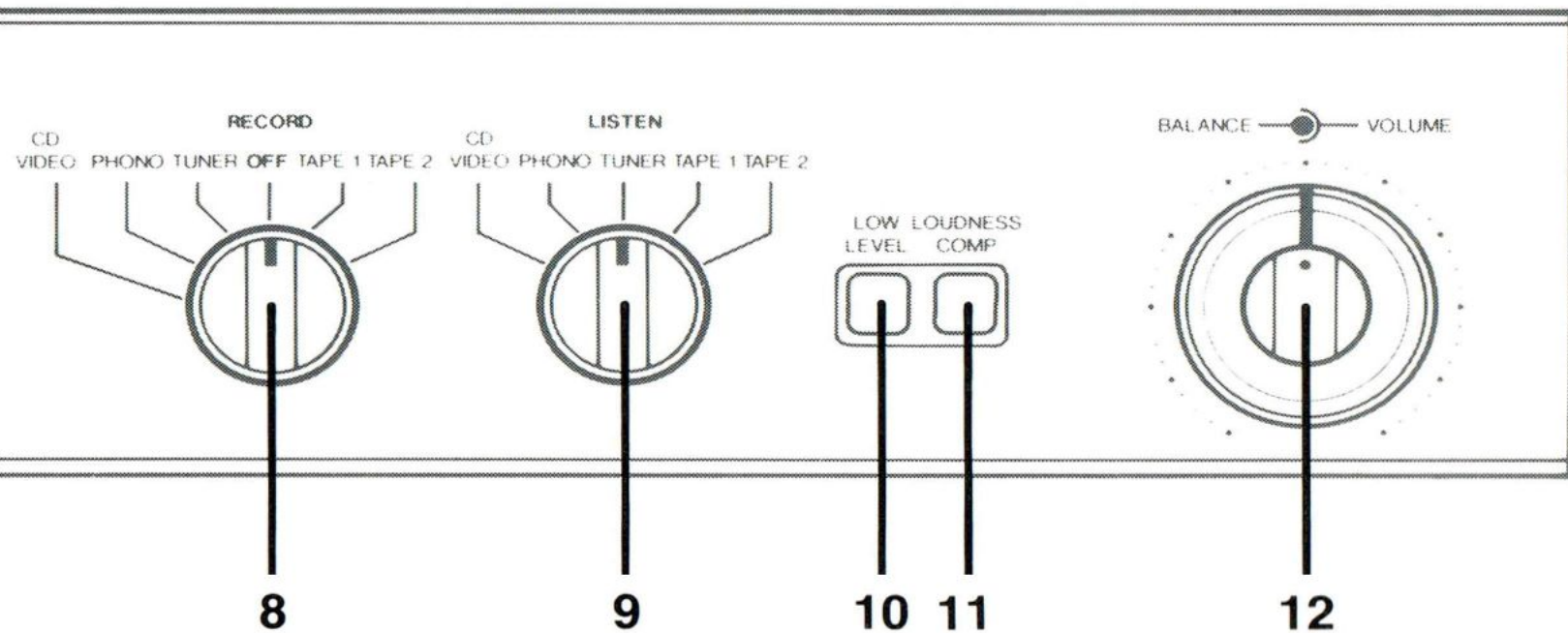
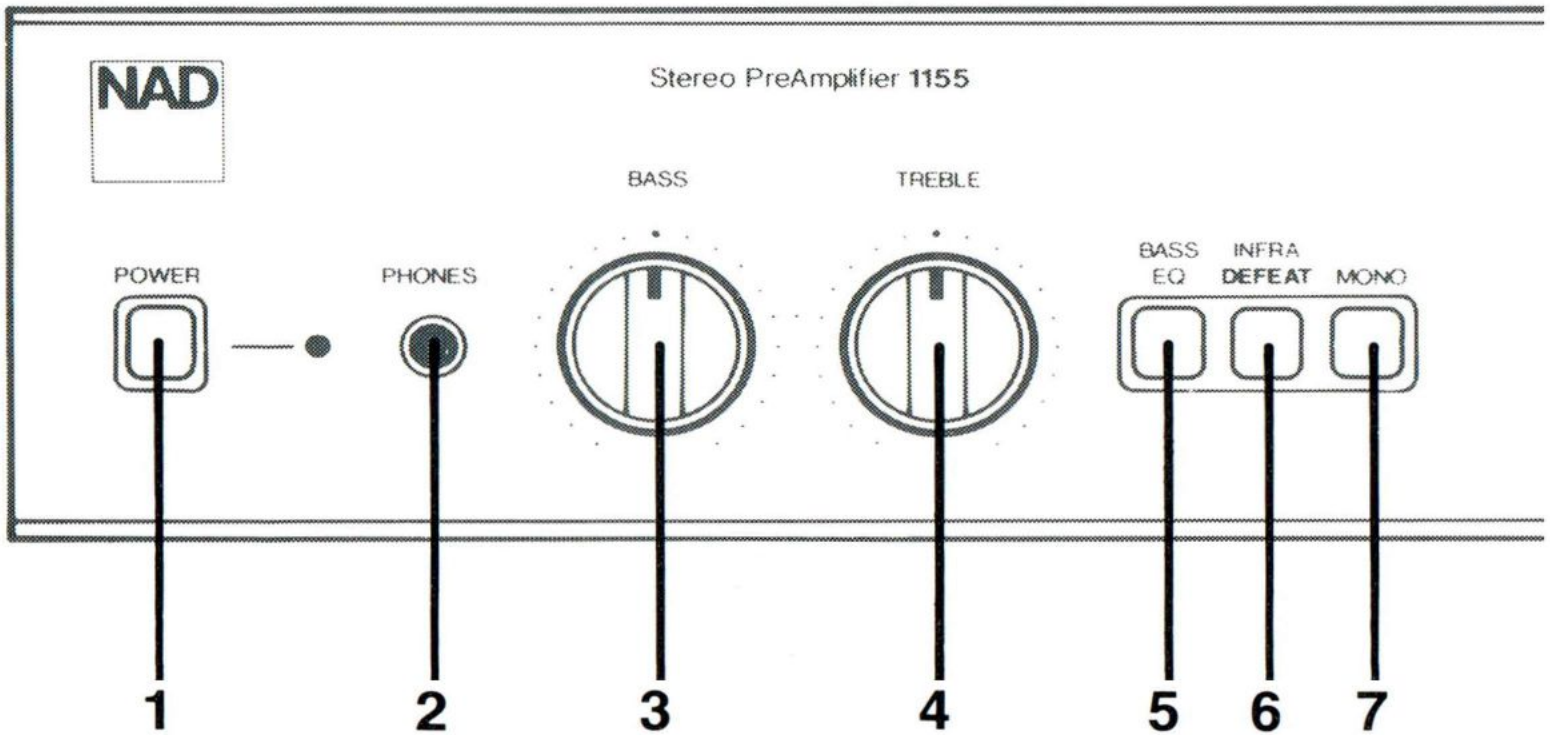


CAUTION
RISK OF ELECTRIC SHOCK
DO NOT OPEN

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.

FRONT PANEL

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



REAR PANEL CONNECTIONS

1. 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.

2. 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. In some cases reversing the orientation of the AC power plug in the wall socket may yield a reduction in hum level.

3. 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.

4. PHONO CAPACITANCE

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 tonearm 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.

5. CD/VIDEO 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 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 may be connected here, such as a spare tape deck, the audio line output from a videocassette or videodisc player, or a television sound tuner.

On this product the upper jack in each pair is for the Left channel, and the lower jack is for the Right channel.

6. TUNER INPUT

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

7. 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 amplifier's TAPE 1 output (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 1 input (PLAY) jacks.

8. TAPE 2 INPUT/OUTPUT

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



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.

the processor's inputs, and another patch cord from processor's outputs to the TAPE 2 input (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 PRE-OUT jacks. The choice is a matter of convenience.

9. 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).

10. PREAMP OUTPUT (HIGH LEVEL)

At this special preamp output the signal level is 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.

11. AC LINE CORD

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

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

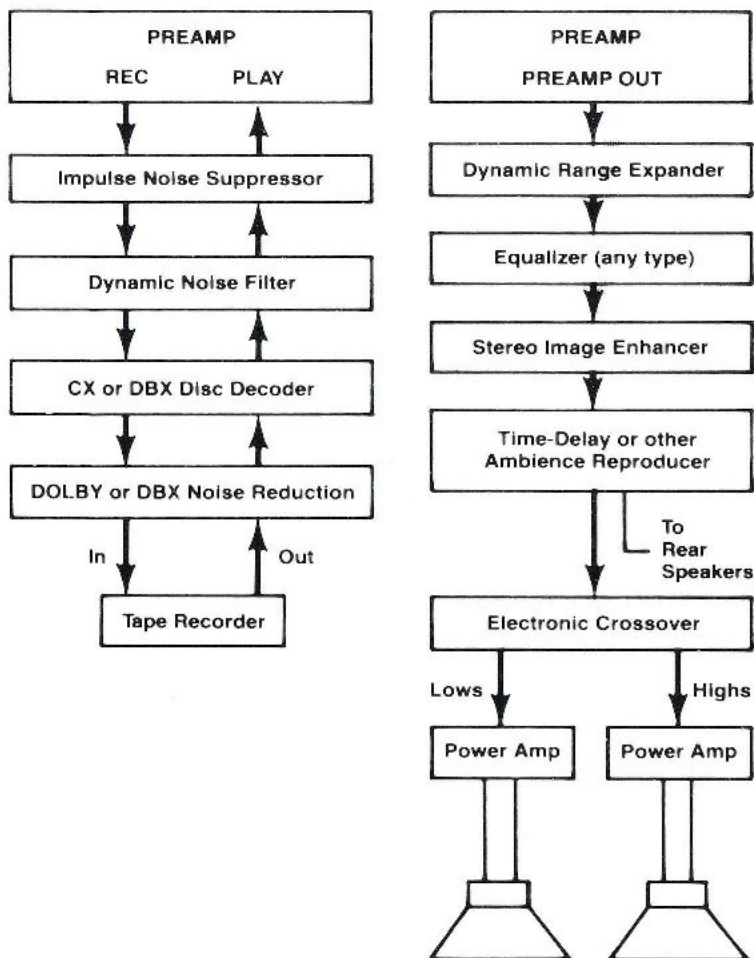
The AC power line cords of other stereo components may be plugged into these accessory outlets. The SWITCHED outlets are intended for all-electronic products (power amp, tuner, equalizer, or other signal processor), and will be switched on and off by the main POWER button. The UNSWITCHED outlets should 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.

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 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.

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/tonerarm 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. RECORD

This switch selects the input signal that will be fed out to the RECOrd jacks on the rear panel for tape recording or signal processing. The selected signal is fed to both TAPE 1 and TAPE 2 and may be recorded simultaneously on two tape machines.

The RECORD selector operates independently of the LISTEN selector; thus you can record from one program source while listening to a different signal source. You can record from the TUNER input while listening to PHONO (or vice-versa), or you can copy recordings from one tape deck onto a second recorder while listening to either tape machine or any other input.

The general rule is that you should always set the RECORD selector to the program source that you want to record from, while setting the LISTEN selector to the input that you want to hear.

In order to dub (copy) tapes from TAPE 1 onto TAPE 2, simply set the RECORD selector to TAPE 1. The playback signal from the TAPE 1 recorder will be fed to the TAPE 2 REC jacks for recording. Then you can set the LISTEN selector to TAPE 1 (to hear the source tape), or to TAPE 2 (in order to monitor the output of the copying recorder). Or you can set the LISTEN selector to PHONO, TUNER, or another input if you want to listen to something else while the copying proceeds. Changing the setting of the LISTEN selector has no effect on the signal fed to the tape recorder by the RECORD selector switch.

Similarly, tapes can be copied from TAPE 2 back to TAPE 1 simply by setting the RECORD selector to TAPE 2. Then set the LISTEN selector to TAPE 2 to hear the original tape, or to TAPE 1 to monitor the output of the copying recorder.

Using a signal processor. If you have a signal processor (such as an equalizer or a DBX unit) connected to the TAPE 2 REC/PLAY jacks, you can use it to process the playback signal from any program source by setting the RECORD selector to the program source that you want to hear. Then set the LISTEN selector to the same input to hear the unprocessed signal, or to TAPE 2 to hear the processed signal.

For example, if you have a DBX decoder connected to the TAPE 2 jacks, you can use it to decode DBX-encoded records by setting the RECORD selector to PHONO. This will feed the preamplified phono signal through the decoder via the TAPE 2 REC/PLAY jacks. Then set the LISTEN selector to TAPE 2 to hear the decoded signal.

If you want to use an equalizer, DBX encoder, or other device to process a signal *before* recording it, you must disconnect the tape recorder from the amplifier's REC/PLAY jacks. Connect only the processor to the amplifier's REC/PLAY jacks (either TAPE 1 or TAPE 2), and connect the tape recorder to the processor's own TAPE record/play jacks.

9. LISTEN

This rotary switch selects the signal that you will hear.

If you have a three-head tape recorder and wish to monitor its playback output while a recording is being made, use the RECORD selector to select the desired input signal and feed it to the recorder. Then set the LISTEN selector to TAPE 1 or TAPE 2 (as appropriate) to hear the monitor output from the recorder.

Similarly, if you have a signal processor connected to the TAPE 2 jacks and want to hear the processed signal, first use the RECORD selector to choose the desired input signal and feed it to the processor. Then set the LISTEN selector to TAPE 2 to hear the processed signal.

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.

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