

NAD

6300

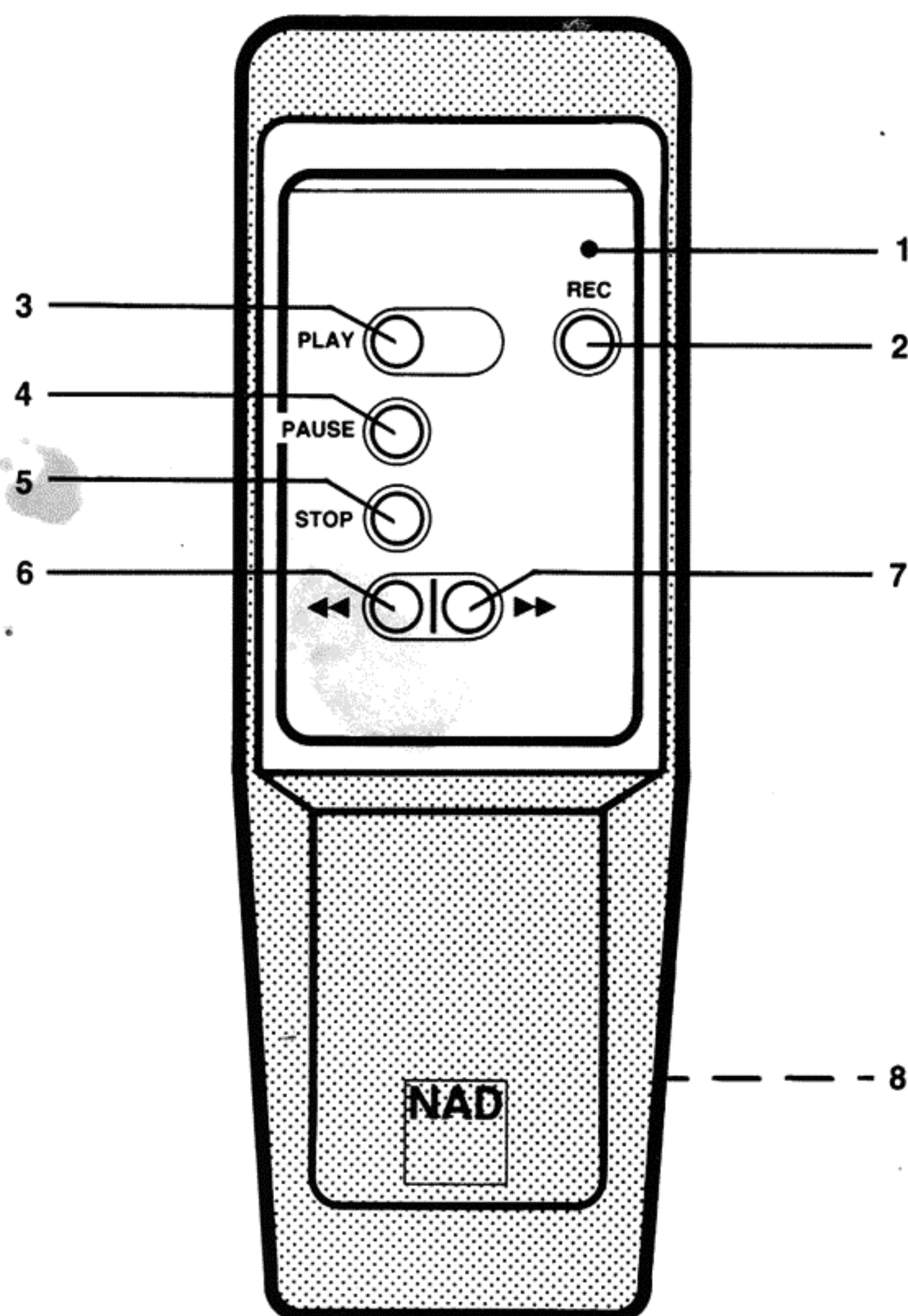
CASSETTE DECK

MONITOR SERIES

INSTRUCTIONS FOR INSTALLATION AND OPERATION

NAD 6300RC REMOTE CONTROL

1. Transmit Indicator.
2. Record.
3. Play.
4. Pause.
5. Stop.
6. Rewind (◀◀).
7. Fast Forward (▶▶).
8. (on back) Battery Compartment.



INSTRUCTIONS FOR OPERATION

A wireless remote control is provided with the Model 6300, enabling you to operate recording and playback functions from the comfort of your chair (or from virtually anywhere in the room). The unique, ergonomically derived design of the NAD remote control offers several benefits:

1. Since the control beam is transmitted from the back rather than from the end of the controller, the unit need not be pointed end-on at the recorder. You may hold it at a comfortable angle in front of you, or even hold it vertically, making it easy to see the buttons as you press them.

2. When the controller is held in the right hand, all of the buttons are located so that they fall under the natural arc of the thumb.

3. The transmitting end of the controller is canted upward so that, if you prefer, you can place the unit on a tabletop or on the arm of a chair and use a forefinger to operate it.

The green Transmit indicator, located in the upper-right corner of the remote control panel, glows when any remote command is being transmitted. If it does not illuminate when a button is pressed, the batteries may be weak and should be replaced.

On the front panel of the Model 6300, a green LED below the counter/timer display illuminates briefly when a remote command is received. The remote control produces a strong enough infrared control signal that, in many cases, reflections off the walls and ceiling will be sufficient to operate the Model 6300, regardless of how the remote control is held or aimed. But for the most reliable operation there should be a clear line-of-sight path from the back of the remote control to the front of the recorder. If the Model 6300 does not respond to remote commands, and the Transmit indicator on the remote control glows brightly when buttons are pressed (indicating that the batteries are healthy), it may be that the line-of-sight path from the remote control to the recorder is obstructed by clothing, paper or furnishings.

Each button on the remote control produces the same effect as the corresponding button on the front panel of the Model 6300. Refer to the detailed description of each control function in the instruction booklet.

Exception: the remote control can transmit only one command at a time. Commands that involve pressing two buttons at the same time (e.g. "punch-in" recording, holding down PLAY or PAUSE while activating RECORD) cannot be executed with the remote control. To begin recording, first press STOP to be sure the recorder is in STOP mode. Press REC to activate the recording circuits, and then press PLAY to start the tape moving.

BATTERY REPLACEMENT

If the Transmit indicator does not glow brightly when remote control buttons are pressed, or if the Model 6300 does not respond to remote commands, the batteries may be weak and should be replaced. The unit requires two 1.5-volt AA-size penlight cells. Alkaline cells are recommended, to obtain maximum operating life.

To open the battery compartment, press down with the thumb at the center of the ribbed area on the back of the remote control unit. The cover of the battery compartment will slide down and off. Install fresh cells, orienting them as shown on the diagram within the compartment. The protruding coil springs should contact the (–) end of each cell. Slide the battery compartment cover back on until it latches.

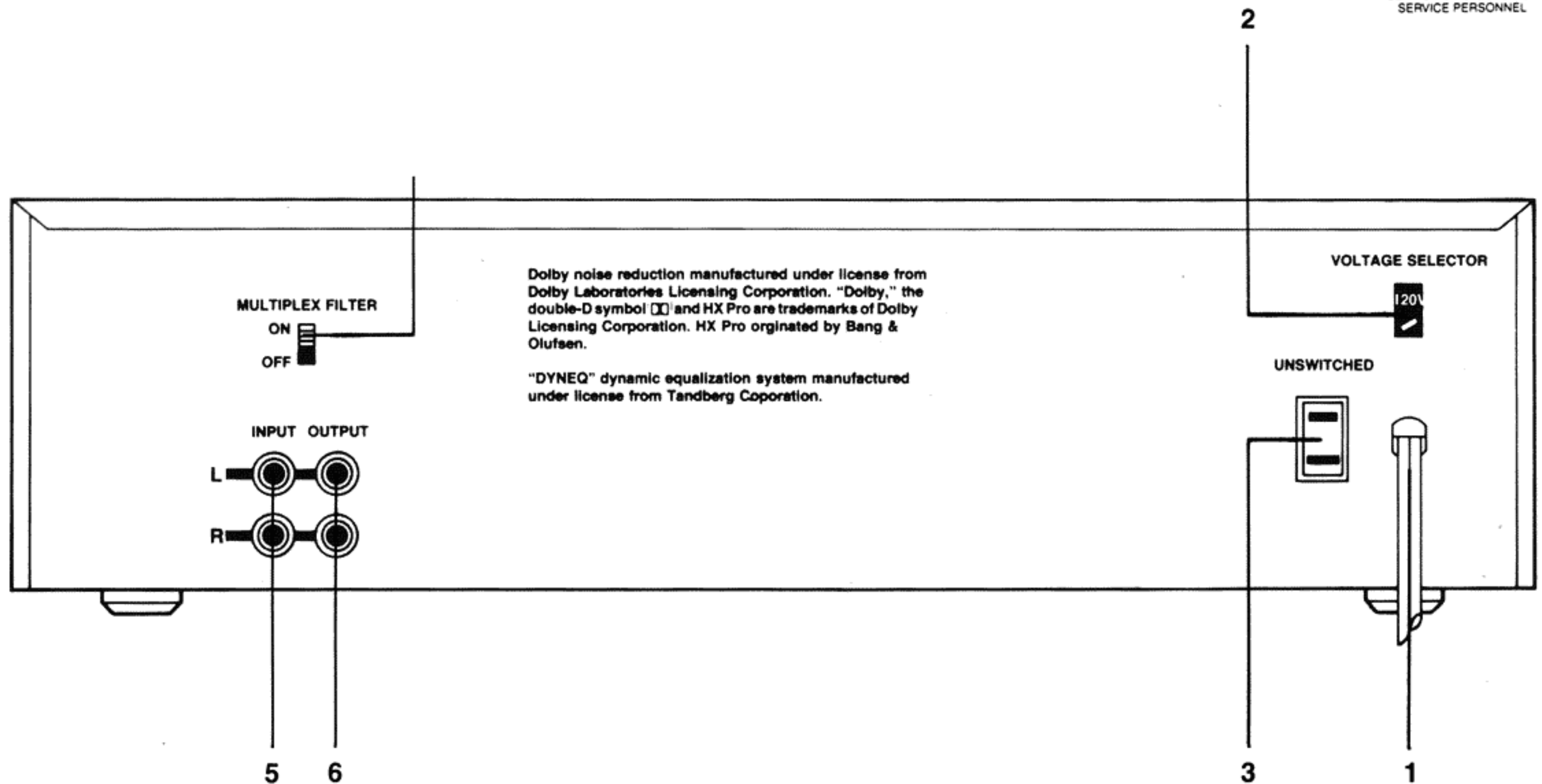
REAR PANEL

1. AC Power Cord.
2. Voltage Selector.
3. Accessory AC Outlet.

4. Multiplex Filter.
5. Line Input.
6. Line Output.

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.

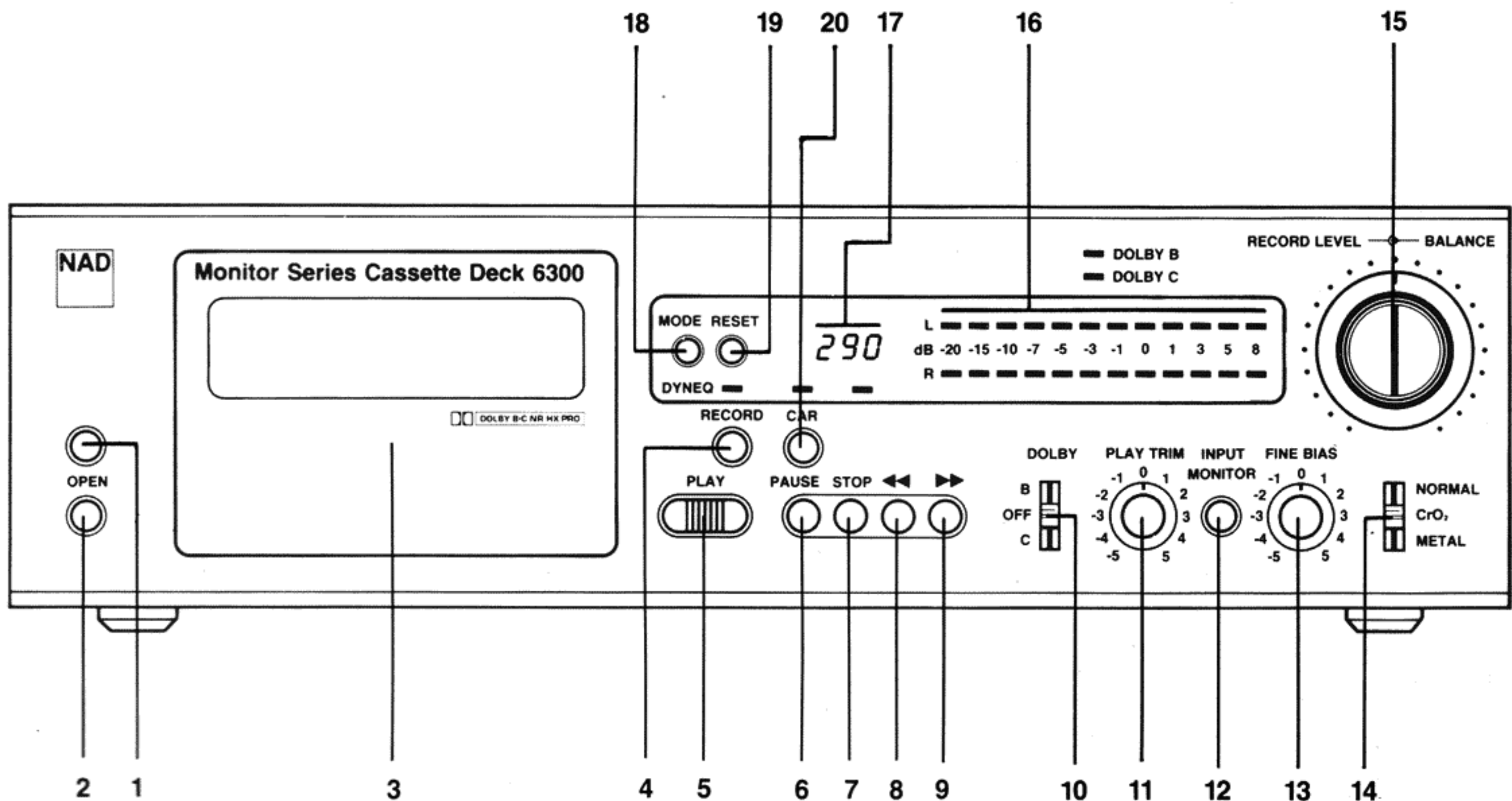


FRONT PANEL

1. Power.
2. Open.
3. Cassette Compartment.
4. Record.
5. Play.
6. Pause.
7. Stop.
8. Rewind (◀◀).

9. Fast Forward (▶▶).
10. Dolby NR.
11. Play Trim.
12. Input Monitor.
13. Fine Bias.
14. Tape Selector.
15. Recording Level/Balance.
16. Recording Level Display.

17. Tape Counter/Timer.
18. Mode (Clock/Count).
19. Reset.
20. CAR Processor.



A NOTE ON INSTALLATION

The excellent performance of this tape recorder depends on an array of precisely machined parts, fine bearings, smoothly polished surfaces, sensitive detection of the weak magnetic fields in tape recordings, and amplification of very small signal voltages. Consequently the recorder's performance can be adversely affected by external magnetic fields, electrical interference, vibration, heat, moisture, or chemical fumes.

Thus if it is placed directly on top of a power amplifier, the recorder may pick up a low-frequency hum from the amplifier's power transformer. If you wish to install it next to an amplifier on the same shelf, place the recorder on the left so that its cassette compartment will be located away from the amplifier.

The recorder should not be placed on a loudspeaker or on a television set (a source of strong magnetic fields as well as vibration), nor in direct sunlight, nor very close to a steam radiator, nor in a workshop where metal filings and chemicals are found. The recorder will function best at temperatures that are comfortable for people, and it can be stacked or shelved with the remaining components in your stereo system.

If you are located near a powerful television or radio transmitter (including a Citizen's Band or short-wave unit) you may pick up interference, especially when playing previously recorded tapes. If you encounter this type of radio-frequency interference, you may succeed in reducing it by experimenting with the location and orientation of the recorder. If the problem persists, your dealer or a service shop may be able to add approved circuit modifications or extra internal shielding.

REAR PANEL CONNECTIONS

1. AC POWER CORD

Connect the AC power cord to a convenient wall outlet or to an "unswitched" AC convenience outlet at the rear of your amplifier.

2. VOLTAGE SELECTOR

Set this control to match the AC power line voltage before plugging the AC line cord into a socket.

Normally the selector will be set correctly by your NAD distributor to match the power-line voltage in your area. To change the setting, insert the tip of a screwdriver into the slot and turn to the left or right until the correct voltage is selected.

3. AC ACCESSORY OUTLET

The AC power line cord of another stereo component may be plugged into this accessory outlet. It is an "unswitched" outlet, unaffected by this unit's Power button.

4. MULTIPLEX FILTER

This filter is intended for use when you are making recordings with Dolby* B-type noise reduction. Any ultrasonic interference in the input signal during recording, such as a multiplex pilot signal in a stereo FM tuner, could cause mistracking of the Dolby NR circuit and yield dull sound when the recording is played back. To prevent this mistracking, and to preserve a flat frequency response with Dolby NR, the filter should be switched ON whenever a recording is made using Dolby B NR. The filter blocks frequencies higher than about 15 kHz in the signal.

When playing previously recorded tapes, a very slight extension of high-frequency bandwidth may be obtained by switching the filter OFF. But remember to switch it back in when making recordings with Dolby B NR.

If you make any recordings with the Dolby NR switched OFF, the filter is optional. It is also optional when you are using Dolby C NR, since the Dolby C NR circuit contains some ultrasonic filtering of its own.

5. LINE INPUT

This recorder is intended to be connected to the REC (output to tape) and PLAY (input from tape) jacks at the rear of any conventional stereo amplifier or receiver. Plug one end of a stereo connecting cable into the recorder's LINE INPUT jacks, and plug the other end into the TAPE OUT (RECORD) jacks of the amplifier.

Make sure that each plug is inserted fully into its socket, and observe the color coding of the plugs (using the red plug for the right channel, for example) to ensure that the stereo channels are connected consistently at both ends of the cable.

6. LINE OUTPUT

To play tapes, plug one end of a stereo connecting cable into the recorder's LINE OUTPUT jacks, and plug the other end into the TAPE IN, PLAY, or MONITOR input jacks of the amplifier. Make sure that each plug is inserted fully into its socket, and observe the color coding of the plugs to ensure that the stereo channels are connected consistently.

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Noise reduction and headroom extension manufactured under license from Dolby Laboratories Licensing Corporation. HX Professional originated by Bang and Olufsen. "Dolby" and the double-D symbol are trademarks of Dolby Laboratories Licensing Corporation.



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.

CONNECTING TWO RECORDERS

Some stereo amplifiers have two sets of tape input output jacks, with front-panel switching to permit using two tape decks for recording or playback and to permit copying tapes from one to the other. If your amplifier has only one set of connections for a tape recorder, it is still possible to use two recorders with it.

The most convenient and flexible method is to purchase an external switch-box (Tandy Radio Shack 42-2105 or equivalent), which will provide input output connections for up to three recorders and allow copying among them. The alternative methods described below are less flexible, but they cost less and yield equally good recordings.

COPYING

Connect the "copying" recorder (the machine on which the new copy will be recorded) to the amplifier's TAPE recording playback jacks as described above. Then connect the Line Output of the "source" recorder (the machine containing the tape that you want to copy) to the AUXiliary input of the amplifier, and switch the amplifier's Input Selector to AUX.

An alternative procedure is to disconnect the cable that goes from the amplifier's Tape REcording output to the recorder's Line Input. Connect the cable directly from the "source" recorder's Line Output to the copying recorder's Line Input. With this connection you must activate the copying recorder's RECORD function in order to hear the playback output of the source machine.

PARALLEL RECORDING

Two recorders can be wired in parallel to permit simultaneous recording on both. Obtain two "Y-connector" adapters, each having two female phono sockets and one male phono plug (e.g. Tandy Radio Shack 42-2436 or equivalent). Plug the Line Input cables from the two recorders into the Y-adapters. Connect the right-channel (red) plugs from both cables to one Y-adapter, and connect the left-channel plugs from both cables to the other Y-adapter. Finally, plug the Y-adapters into the Tape REcording jacks of the amplifier. This hookup allows you to record freely on either machine, or simultaneously on both, but not to copy tapes from one to the other.

NOTE: This method of parallel connection is suitable only for recording—not for playback. If you were to use Y-connectors to combine the Line Output signals from two tape decks, each machine's output would tend to short-circuit the other's, yielding a low playback level and possibly higher distortion. Only one tape deck's Line Output can be connected to the amplifier's Tape PLAY input jacks.

To hear the playback from the second recorder, connect its Line Output to the amplifier's AUX input. But observe this precaution: never switch the amplifier's Input Selector to AUX while recording on the same machine. Doing so would create a feedback oscillation that could damage your loudspeakers.

FRONT PANEL CONTROLS

1. POWER

Press this button to switch on the power to the cassette deck. To turn the power off, press again and release.

2. OPEN

When this button is pressed, the door of the cassette compartment swings open to allow a tape to be inserted or removed. The tape cassette is held in a carrier within the door assembly.

To insert a tape cassette, remove it from its protective box. Hold it with the thick edge down, and with the full tape spool at the left side of the cassette. Press the OPEN button to open the door, slide the cassette into the door's carrier slot, and push the door to close it.

3. CASSETTE COMPARTMENT

To load a tape cassette into the machine for recording or playback, remove it from its protective box. Hold it with the thick edge down, and with the full tape spool at the left side of the cassette. Press the OPEN button to open the door to the cassette compartment, drop the cassette into the door's carrier slot, and push the door closed until it latches. The cassette will automatically be guided into correct position and alignment within the compartment.

4. RECORD

This button activates the recording circuits and the Recording Level display. To make a recording, press RECORD and also PLAY (to engage the transport and move the tape over the heads).

A red indicator above the RECORD button illuminates when the machine is in the recording mode. When recording, the machine automatically erases any previous recording that may be on the tape. (To prevent accidental erasure of precious recordings, remove the erasure-prevention tabs from any cassette that you don't intend to re-record on. When these tabs are missing from a cassette, a safety latch in the recorder prevents the recording circuits from operating. This latch also blocks the recording function when there is no cassette in the compartment.)

You can begin recording in any of three ways:

1. Press RECORD and PLAY simultaneously.
2. Press RECORD to turn on the recording circuits and the recording-level display. Adjust the recording level (with the tape not moving). When ready to proceed, press PLAY to begin storing the recording on tape.
3. "Punch-in" recording. On a tape that contains a previous recording, play the tape (with the INPUT MONITOR button OUT). When you come to the point on the tape where you want the new recording to begin, hold down the PLAY key and press RECORD to start the new recording "on the fly."
4. This is a more controlled approach to punch-in recording. On a tape that contains a portion of a previous recording, press PLAY (with the INPUT MONITOR button OUT). When you get to the point on the tape where you want to begin a new recording, press PAUSE. While pressing and holding the PAUSE button, press RECORD. Press INPUT MONITOR to hear the incoming signal. When you are ready to start the new recording, press PLAY to begin.

To stop recording at any time and de-activate the recording circuits, press STOP.

To stop recording briefly while leaving the recording circuits and recording-level display active, press PAUSE. (Press INPUT MONITOR to continue hearing the input signal.) When ready to resume recording, press PLAY. This technique is useful for omitting announcements when recording from radio or television.

5. PLAY

When this button is pressed, the tape is moved from left to right at normal playing speed, the recorder's heads are brought into contact with the tape, and the playback circuits are activated. At the end of the tape, the transport automatically stops and disengages itself from the tape.

6. PAUSE

This button halts the motion of the tape in the PLAY and RECORD modes, while leaving the playback or recording circuits active.

To resume either playback or recording, press PLAY.

NOTE: The PAUSE control is intended to stop the tape motion only temporarily. To stop the tape for more than a few minutes, use the STOP button.

7. STOP

Press this button to stop the tape motion. It disengages all tape-transport functions, including RECORD and PAUSE.

8. REWIND (◀◀)

The ◀◀ button winds the tape rapidly from the right (take-up spool) back toward the left (supply spool). The tape will continue to rewind rapidly until you press STOP or until the beginning of the tape is reached. Since the head is not in contact with the tape, no sound will be heard.

9. FAST FORWARD (▶▶)

The ▶▶ button winds the tape rapidly forward from the left to the right, i.e. from the beginning toward the end of a recording. The tape will continue to fast-wind forward until you press STOP or until the end of the tape is reached. At the end of the tape the transport will disengage automatically. Since the record-playback head is not in contact with the tape, no sound is heard.

10. DOLBY NR

The recorder is equipped with two types of Dolby noise reduction. Dolby C NR provides the greatest quieting of tape hiss, important when taping "live" musical performances or wide-range recordings (digital Compact Discs, for example). Dolby B NR provides optimum compatibility with older tape recorders, portable and automobile stereo tape players, and should also be used when playing most pre-recorded music cassettes.

Each type of Dolby NR involves complementary processes that are intended to match each other in recording and playback. Thus if a tape is recorded with Dolby C-type noise reduction, it must also be played back with the Dolby C-type NR circuit operating in order for the benefits of the Dolby NR system to be obtained. Similarly, if Dolby B-type NR is used in recording it should be used in playback as well. To avoid confusion, it is recommended that you label each cassette "B" or "C" when it is recorded, to indicate the type of noise reduction used.

Both types of Dolby NR operate by selectively compressing the dynamic range of the middle and high frequencies in the signal during recording. I.e. the circuit selectively boosts the level of those middle-to-high frequency sounds that occur at a naturally low level, so that these sounds will be recorded on the tape at a level substantially higher than the tape's own hiss. Then, in playback, these signals are expanded back to their original dynamic range; the quiet middle and high frequency sounds that were boosted are finally cut back down to their original levels, and the tape's hiss is reduced at the same time.

Dolby B and Dolby C differ in the amount of complementary boost/cut that they provide, and in its frequency distribution. Dolby B NR operates mainly at high frequencies and suppresses tape hiss by a maximum of 10 dB. Dolby C NR

operates at both middle and high frequencies and reduces hiss by as much as 20 dB. The two Dolby NR systems are not interchangeable. If you record with Dolby B NR and play back with Dolby C NR (or vice versa) the tonal balance of the musical sound will be substantially altered.

Also, any brightening or dulling of the sound that is caused by a mismatch between the recorder and the tape will produce mistracking in the Dolby NR circuit and yield an exaggerated brightening or dulling of the playback sound. So when the Dolby NR circuits are to be used, it is especially important that the Tape Selector be correctly set to match the tape (both in recording and in playback).

11. PLAY TRIM

Errors in high-frequency response often occur in cassette recordings, especially in tapes that were recorded on one machine and are being played on another. These errors arise from tape saturation (especially in recordings made on recorders without Dolby HX Pro headroom extension); from biasing that didn't match the tape when the recording was made; and from differences in equalization and head azimuth among recorders.

These errors cause mistracking of the Dolby NR circuits, and the mistracking causes larger variations in frequency response, often resulting in dull sound. Play Trim is a special high-frequency playback equalization circuit, located ahead of the Dolby NR circuit so that it can be used to restore accurate playback response before Dolby NR decoding takes place. Standard playback equalization, for ideally recorded tapes, is provided when the Play Trim control is set at the detent in the center of its range.

When playing tapes, first set the Tape Selector and Dolby NR to match the recorded tape. If the recording sounds dull, turn the Play Trim up (clockwise) to restore accurate highs. If the recording sounds edgy or sibilant, turn the Play Trim down to obtain smoother treble.

12. INPUT MONITOR

In the normal (OUT) position of this button, the playback signal from the tape is fed to the output of the recorder. (Consequently, the output is silent when no tape is being played.)

When the INPUT MONITOR button is IN, the signal that is being fed to the recording circuits is also fed to the recorder's output.

This button has two major uses:

1. When you are preparing to make a recording, use the INPUT MONITOR to hear the input signal, in order to commence recording at the desired time.

2. When recording, use the INPUT MONITOR to compare the input signal versus the recording in order to check the accuracy of the latter.

Since this is a "three-head" recorder with independent recording and playback circuits, the signal is played back from the tape immediately after it is recorded. This playback signal is heard when the INPUT MONITOR button is OUT, permitting a precise comparison of the recording versus the input signal.

13. BIAS FINE-TUNE

While the Tape Selector provides the large changes in recording bias and playback equalization that are needed to accommodate the three standard classes of tape, there are significant brand-to-brand differences in sensitivity and frequency response among tapes within each group. The Bias fine-tuning control allows you to compensate for these differences, and so to make the most accurate recording with any reputable brand of tape.

Matching the recorder's bias to the tape is especially important when Dolby noise-reduction is used, because any departure from flat high-frequency response in the recording

will be magnified by the Dolby NR circuit during playback, making the sound excessively bright or dull. The procedure for finetuning the bias to obtain accurate response involves making brief trial recordings, as follows:

- (1) Load the selected cassette in the recorder and fast-wind the tape forward for a few seconds to get past the blank leader tape at the beginning.
- (2) Set the Play Trim control to 0 (the detented position at the middle of its range).
- (3) Set the Tape Selector to match the tape type.
- (4) Set the Dolby NR switch to "C" and switch the MPX filter on. (Even though you may be planning to make a recording with Dolby B-type NR, it is best to use Dolby C-type NR while adjusting bias because it enhances the audibility of any response errors caused by over- or under-biasing.)
- (5) Set the Bias fine-tuning control to 0 (i.e. to the detented position at the center of its range), unless you have reason to prefer a different trial setting.
- (6) Record a brief sample of music at low recording levels (approx. -15 dB). For best results the music should have obvious high-frequency content. A convenient alternative, especially when the most accurate results are desired, is to record interstation hiss from an FM tuner (with its muting off) at a level of about -20 dB.
- (7) Using the INPUT MONITOR button, compare the tonal balance of the recording versus that of the input signal.
- (8) If the recording sounds duller than the original sound, raise the setting of the Bias fine-adjust control (move it toward the - symbol) to obtain brighter highs.

On the other hand, if the trial recording sounds bright, edgy, and distorted, reduce the setting of the Bias fine-adjust control (move it toward the + symbol) to obtain smoother highs.

(9) With metal-particle tapes (Type IV), you will find that the effect of bias change is relatively subtle, and you may have to move the bias fine-tuning control all the way to the end of its range to produce an audible change in tonal balance. But with normal tapes (Type I), a modest change in bias usually produces an obvious change in tone quality.

(10) After you have discovered the Bias setting that yields the best results with a particular brand and type of tape, write it down (perhaps on the cassette label). Then, the next time you make a recording using the same brand and type of tape, you can easily re-set the Bias control to the optimum position. If you use a single brand of tape regularly, it will be convenient to leave the Bias fine-tuning control at the optimum setting for that tape. But if you record on a variety of tapes, you may want to compile a list of optimum bias settings as you discover them, and post them on a card located near the recorder for convenient reference.

(11) Remember, the Bias fine-tuning control affects tapes only while the recording is being made. It cannot be used to improve the quality of tapes after they are recorded.

14. TAPE SELECTOR

The tape selector chooses standard levels of bias (for recording) and equalization (for playback), for each of three standard types of cassette tape. Whenever you record or play a tape, this selector must be set to match the tape. If you are not careful about this, the clarity and tonal balance of your recordings will vary a great deal, especially when Dolby noise reduction is used.

I. Normal. The largest variety of cassette tapes are intended for use with the NORMAL setting of the tape selector. Look at the cassette package for a statement of "normal bias" or "120 μ sec" equalization. In general, tapes described as "ferric oxide," "low noise," or having the

Roman numeral I in their designation, are intended for the NORMAL setting.

II. CrO₂. The CrO₂ setting is intended for tapes employing chromium dioxide or the "chrome-equivalent" cobalt-doped high-bias ferric oxide. Usually these are identified as requiring "high bias," "70 μ sec" equalization, or have the Roman numeral II in their designation.

IV. Metal. The Metal setting should be used with metal-particle tapes, which may be labeled with the Roman numeral IV.

15. RECORDING LEVEL/BALANCE

The knurled outer ring of this two-section knob is the Recording Level control, which adjusts the volume of the input signal as it is fed to the recording circuits.

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.

Correct channel balance is an important factor in stereo recording; a balance shift of 1 dB is audible. The best way to evaluate the balance is to listen to recordings as you make them. During recording the signal is fed to the deck's outputs; thus you can hear the signal via your amplifier's Tape Monitor and judge the channel balance by ear. Typically the optimum balance setting is that which places the image of a soloist or radio announcer precisely midway between your speakers, or that which yields the most uniform spread of sound across the space between the speakers while providing the best reproduction of depth and "air" in the image.

16. RECORDING LEVEL DISPLAY

This dual row of LEDs display the peak level of the signal in each channel during recording or playback. The green LEDs (below 0 dB) indicate normal recording levels. The amber LEDs (at -3 and -5 dB) indicate the maximum recommended recording levels for sustained sounds, e.g. a singing voice or full-orchestral chord, while the red LEDs indicate the maximum recommended levels for the short-term transient sounds in music.

The standard procedure is to set the recording level to accommodate the loudest parts of the music, and then leave the controls alone. With music that spans a wide range of volume levels, such as a symphony, this may mean that the quiet portions of the music will be recorded at a level of -20 dB or below (with no LEDs illuminated). This is normal.

To learn how to set optimum recording levels, the following experiment is recommended. Select a typical recording of music, and record an excerpt from it several times in succession, setting the recording level progressively higher each time. For example set the maximum peak level at about -10 dB the first time, and repeat it at about -5, then 0, then +5, and finally so high that all of the LEDs are frequently lit. Using the INPUT MONITOR button, compare the recorded sound versus the input signal, and listen for symptoms of tape saturation in the sound. (Adjust your amplifier's volume control to compensate for the different loudness levels of the sample recordings, so that you can focus your attention on the quality of the sound without being distracted by volume differences.)

At a peak level of +10 dB the sound should be clear, open, and detailed, but the background of tape hiss may be bothersome. In the last recorded segment (with all of the LEDs lit) you probably will begin to hear the effects of tape saturation: boomer bass, mushy midrange, or dull treble. Also, tape saturation will reduce the peak levels: a signal that was recorded at +8 dB may play back at only +3 dB.

The optimum recording level is the highest level that you can use (in order to minimize audible hiss in playback) without encountering audible tape saturation. As a general

rule, you can use higher recording levels for brief transient sounds (such as drumbeats) than for continuous, sustained tones (e.g. the singing voice). And you can use higher recording levels for sounds whose energy is concentrated at mid-range frequencies (e.g. spoken voice) than for sounds that have a great deal of energy at very high frequencies (cymbals, bells, harpsichord) or at very low frequencies (pipe organ, bass drum). With the latter, the peak level usually should be set no higher than -5 dB.

When in doubt it usually is best to err on the conservative side, sacrificing a bit of potential signal-to-noise ratio in favor of a little extra undistorted headroom for musical peaks. With Dolby C-type noise reduction to minimize any audible tape hiss, you can afford to under-record slightly. This practice will help to ensure that you preserve all of the air, brilliance, and detail in the original sound.

You may find that, in order to achieve the correct peak recording levels, you have to set the RECORD LEVEL control to a different position for recording from Compact Discs or FM broadcasts than when recording from LP records. This is normal.

17. TAPE COUNTER/TIMER

This dual-mode counter registers either the current position along the length of the tape or the running time of a recording (in minutes and seconds). If you re-set the position counter to 0 at the beginning of a tape, then the counter readings will provide a convenient method of identifying the locations of selections on the tape. (Alternatively, you may prefer to re-set the counter to 0 at the location of a point on the tape to which you want to return later.)

Use the MODE button to switch to the Time display. If this is re-set to 0:00 at the beginning of a tape, then it will keep track of the accumulated playing time of the tape as you make a recording, so you will know when you are approaching the end of the tape. (When the display registers 43:00 on a C-90 tape, you have only about two minutes of recording time left before the tape runs out.)

18. MODE (CLOCK/COUNT)

This button selects the function of the counter display, showing either a position count or an elapsed-time count.

19. RE-SET

This button re-sets the displayed count (either the position count or the running-time count) to zero. The two displays are independent; thus you can re-set the time count to 0:00 without affecting the reading of the position counter, and vice-versa. Both counts are re-set to zero when the Power is turned off.

20. CAR PROCESSOR

This button engages a dynamic processor that optimizes recordings for playback in a car or portable tape player. The circuit operates on the recorder's input signal; thus it is used when recording tapes, not when playing them back. An amber indicator above the CAR button illuminates when the processor is engaged.

The processor compresses the dynamic range of the recording by boosting all low-level sounds approximately 20 dB, ensuring that they will remain audible despite the high background noise of the car environment. This processing is especially recommended when copying wide-range recordings from Compact Discs for playback via a car or portable tape player.

The processing operates on the input signal, so you can use the INPUT MONITOR to hear the compressed input. This can be an effective way to reduce the dynamic range of CDs (and other wide-range recordings) for late-night playback or to provide background music for parties.

Remember to switch the CAR processor OFF when recording tapes for normal home playback.

The CAR processor has no effect on the playback of recorded tapes.

OPERATING PROCEDURES AND HINTS

TO PLAY RECORDED TAPES

(1) Before inserting a cassette, check it to be sure that the tape is straight and taut where it is exposed at the thick edge of the cassette. If necessary, insert a pencil into either hub and manually wind the tape spool until any slack is taken up.

(2) Press the OPEN button to open the door. Insert the cassette with the thick edge down and with the full spool of tape at the left side. Push the door closed.

(3) If the tape has been in storage for several months, it may be necessary to loosen the tape pack by fast-winding the tape. Press FAST FORWARD (▶▶) to wind the tape through its entire length, then REWIND (◀◀) to return to the beginning.

(4) Set the Tape Selector to match the type of tape being played. For pre-recorded music cassettes this is usually NORMAL (I). In the case of chromium dioxide tapes, examine the package: If "120 microsecond" equalization is specified, use NORMAL (I); if not, set the selector to CrO₂ (II).

(5) If the tape was recorded with Dolby B NR or Dolby C NR noise reduction, use the same Dolby NR setting for playback. (Most commercially pre-recorded music cassettes are made with Dolby B-type NR encoding.)

If the tape was recorded with no noise-reduction, switch the Dolby NR OFF. Occasionally, some older pre-recorded cassettes may also sound better with Dolby NR OFF; experiment with the Dolby NR settings to determine how the tape sounds best.

If the tape was recorded with DBX noise reduction, switch the Dolby NR OFF and connect the tape deck to an external DBX noise-reduction decoder for playback. But remember to switch the Dolby NR back on when recording your own tapes.

(6) You may switch off the MPX filter to obtain the most extended high-frequency response during playback, but the difference that it makes may be too slight to hear. (Remember to switch the filter back on when making recordings with Dolby B-type NR.)

(7) Press PLAY. To hear the playback from the tape, the INPUT MONITOR button must be OUT.

(8) Set the Play Trim control at 0 (the detented position at the center of its range) for normal playback. If the sound is somewhat dull, try turning the Play Trim control UP (clockwise) to restore the "air" and sheen to the sound. If the highs are strident and edgy, try turning the Play Trim control DOWN (counter-clockwise) to obtain smoother treble.

TO MAKE A RECORDING

(1) Before inserting a cassette, check it to be sure that the tape is straight and taut where it is exposed at the thick edge of the cassette. If it is not, manually wind the tape to take up the slack.

(2) Press the OPEN button to open the door. Insert a blank cassette with the thick edge down and with side 1 (or A) facing you. Through the window in the cassette you should see a full spool of tape on the left side.

(3) If the tape is new and has just been unwrapped for the first time, the tape pack may have developed some friction during the period of storage since it left the factory.

To loosen the tape pack, press FAST FORWARD (▶▶) to wind the tape through its entire length, then REWIND (◀◀) to return to the beginning.

(4) Re-set the position counter to 0. Then, as you make the recording, you can take note of the counter reading that corresponds to each recorded selection. Also, switch to the running-time mode and re-set the time to 0:00 at the beginning of the tape.

(5) Set the TAPE SELECTOR switch to match the tape that you are using.

(6) Set the Bias fine-tuning control to 0 (its detented middle position), or to the position that you have previously determined to be optimum for the brand and type of tape that you are using.

(7) Switch on the Dolby noise reduction. Select Dolby C-type NR for maximum quieting of background tape hiss, unless you are recording a tape for playback on a portable or other machine that has only Dolby B-type NR or no noise reduction at all. When recording with Dolby B NR, switch the MPX filter ON.

(8) Press INPUT MONITOR to hear the input signal. In order to determine the optimum setting of the RECORD LEVEL control, press REC to activate the recording circuits without actually depositing a recording on the tape. Observe the recording level display while setting the RECORD LEVEL control so that the highest sustained levels in the music register at approximately 0 dB, with brief peaks causing the red LEDs to flash.

When you are ready to proceed with the recording, press the PLAY button to start the tape moving. (Its motion will be confirmed by the gradually changing reading of the turns counter.) Since the recording circuits are already active, there is no need to press REC again.

(9) In most cassettes the first few inches of tape at either end is a "leader" with no magnetic coating. To get past this leader, advance to about 004 on the turns counter before beginning the recording.

(10) To interrupt the recording at any point, press PAUSE. This will stop the tape while the recording circuits and recording level display remain active. To resume recording, press PLAY.

(11) At the end of the recording session, press STOP. If you want to continue recording on the other side of the cassette, press FAST FORWARD (▶▶) to advance the tape to the end of side A. Remove the cassette, turn it over, and insert it with side B facing you. Press REC to resume recording.

TO ERASE TAPES

The recorder automatically erases previous recordings when a fresh recording is made. To erase an entire tape, simply turn down the RECORD LEVEL control to minimum, press the Record button, and record silence over the full length of the tape.

MAINTENANCE

The bearings and other moving parts in this recorder are assembled with long-life lubricants and require no periodic maintenance. But in order to preserve the machine's

high level of performance, all surfaces that the tape comes in contact with must be maintained free of dirt and free of magnetism.

Regular cleaning is the primary requirement. Dirt particles smaller than a two-thousandth of an inch (0.01 mm), if lodged on the polished surface of the record/play head, can cause a large falloff in high-frequency response. One easy way to clean the heads on a daily basis is to use a head-cleaning cassette (a cassette that contains a textured paper tape instead of magnetic tape). Play the cleaning cassette for several seconds before each recording or playback session, and as the cleaning tape rubs over the heads it will remove accumulated particles of dust and tape oxide.

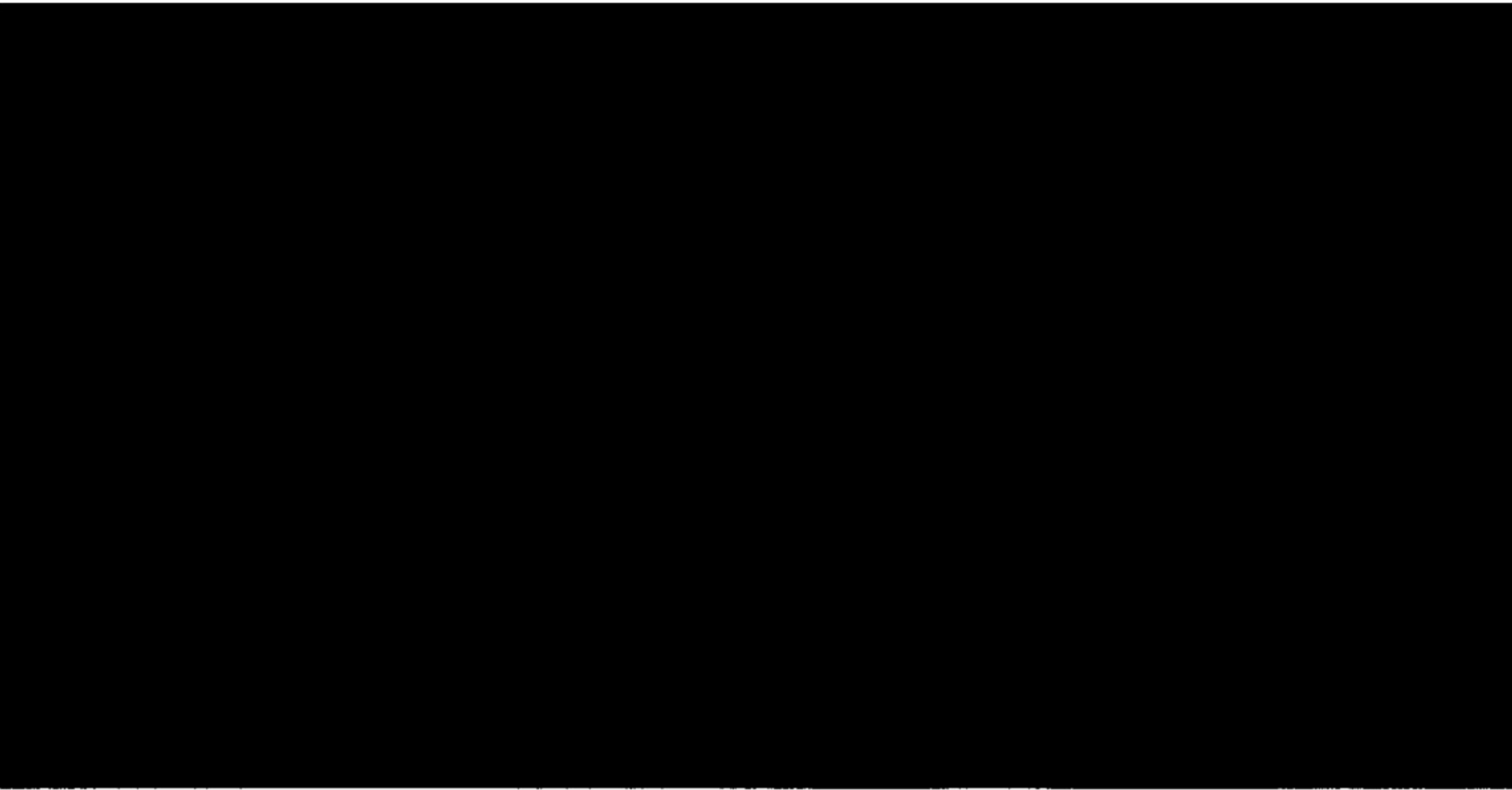
At longer intervals—weekly or monthly depending on how heavily you use the machine—a liquid solvent or spray should be used to remove tape oxides or sticky residue deposited on the heads, capstans, and pinch rollers. Tape head cleaning sprays and fluids are available from your hi-fi dealer and from other sources. We recommend a solution whose active ingredient is either alcohol (denatured or "isopropyl") or Freon (a fluorinated hydrocarbon compound); some head cleaners contain both. If you use isopropyl alcohol, check to be sure that it is pure and does not contain any unwanted oily substances such as lanolin.

To clean the tape transport, remove any cassette from the machine. Use the fluid or spray to moisten a cotton swab, then use the moist swab to scrub the black erase head, the silver-colored record/play head, the steel capstans, and the black rubber pinch rollers.

The door of the cassette compartment can be removed to provide easier access to the heads for cleaning and de-magnetizing. The door is actually in two parts: the framework that holds the cassette, and an exterior plastic trim panel containing the transparent window. Press the OPEN button to swing the door open; remove any cassette, and pull upward on the exterior door panel to detach it from the cassette holder. To re-install the door panel, align its fastening clips with the retainers on the cassette holder, and slide the panel down into place.

During months of regular use the heads and steel capstans may acquire a magnetic charge that could add hiss to all tapes played or recorded in the machine. At least once a year this charge should be removed by using a head de-magnetizer.

Before using the de-magnetizer, switch off the power to the recorder. Open the cassette compartment and remove the door panel. Take away any cassettes from the vicinity. Hold the de-magnetizer away from the machine, to protect the recorder from the de-magnetizer's turn-on surge. Plug in the de-magnetizer, turn it on, and slowly pass its probe tip over the heads and capstans. (The probe tip may be allowed to touch the heads and capstans—but only if its metal surface is covered with a plastic sleeve or wrapped with plastic tape to prevent it from scratching the heads.) Move the probe tip slowly out of the cassette compartment, and hold the de-magnetizer at least a meter (3 feet) away from the recorder before switching it off. If you accidentally switch off the de-magnetizer while its probe tip is near the cassette compartment, the entire de-magnetizing procedure must be repeated.



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