Owner's Manual

Advent Model 100A Noise Reduction Unit

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Introduction

Thank you for your purchase of the Advent Model 100A Noise Reduction Unit. If you have not already done so, please take a moment now to fill in and mail your warranty registration card. NO POSTAGE IS REQUIRED.

The Model 100A has been designed to take advantage of the ever-increasing use of the famous "B-Type" Dolby System of audio noise reduction. The wide-spread use of the Dolby System with home tape recorders, the increasing catalog of Dolby-processed prerecorded cassettes, and the latest application of the Dolby System to FM broadcasting have all contributed to Advent's incorporating into the Model 100A a degree of flexibility found in no other noise reduction unit or recorder with built-in Dolby circuitry.

For clarity's sake, these Instructions are divided into two sections. The first of these, **NORMAL** Mode of the 100A, explains how to use the Model 100A for making and playing Dolby-processed tapes on the recorder connected to it. For these purposes, the Model 100A's **MODE** switch must be in the **NORMAL** position.

The second section, **SPECIAL** Mode of the Model 100A, tells how to use the Model 100A for such purposes as decoding Dolby-processed FM broadcasts, making copies of Dolby-processed tapes, and playing Dolby-processed tapes on another recorder connected to the audio system. For these functions, the Model 100A's **MODE** switch must be in the **SPECIAL** position.

The instructions for the **NORMAL** Mode should be completed before attempting to follow the instructions for the **SPECIAL** Mode.

If you're in a hurry and you know a lot about tape recording, we suggest that you read these Short Form Instructions and the Notes about Calibration on page 8. If you're like most people and have done a moderate amount of recording, then we suggest that you read through the full Instructions that follow and use these Short Form Instructions as a summary and for periodic reference.

Control Functions

The Dolby System* Controls

All of these controls are located within the panel area marked Dolby System.

MODE: The **NORMAL** Mode is used to make and play back Dolby-processed tape recordings on the recorder connected to the Model 100A. The **SPECIAL** Mode is used to 1) Decode and simultaneously record Dolby-processed FM broadcasts, 2) Play back Dolby-processed tapes from other recorders connected to the audio system, and 3) Copy Dolby-processed tapes.

NOISE REDUCTION: This puts the Dolby System in or out of the circuit in recording and playback. You will probably want to use the Dolby System whenever you make a recording for your own use and should leave the switches in as a matter of routine. You can switch the Dolby System out whenever you make a recording for playback on a machine that doesn't use the Dolby System.

REC CAL TONE: This is a spring loaded switch that is used only during the **NORMAL** Mode Record Calibration procedure of the Dolby System. It feeds a Dolby Level tone from an oscillator in the Model 100A to your tape recorder.

MX FILTER: This precise notch filter suppresses the 19 kHz pilot tone of FM multiplex broadcasts. It should *always* be switched in whenever you record and/or listen to an FM broadcast.

DOLBY LEVEL METERS: These two meters are used only for the various calibrations of the Dolby System and should not be used as recording level indicators. That function is left to the record level indicators on your recorder.

PLAY CAL: These controls are used only during the **NORMAL** Mode Play Calibration procedure of the Dolby System.

The Other Controls

Once you have used the recording and playback controls of your recorder to help calibrate the Dolby System (in the way described in the following section), all recording and playback volume functions are accomplished by the Model 100A, not by your recorder.

INPUT LEVELS: The individual **LINE** controls for each channel allow you to balance stereo channels precisely and to mix sound from two input signals on each channel. They replace the function of the record level controls on your recorder.

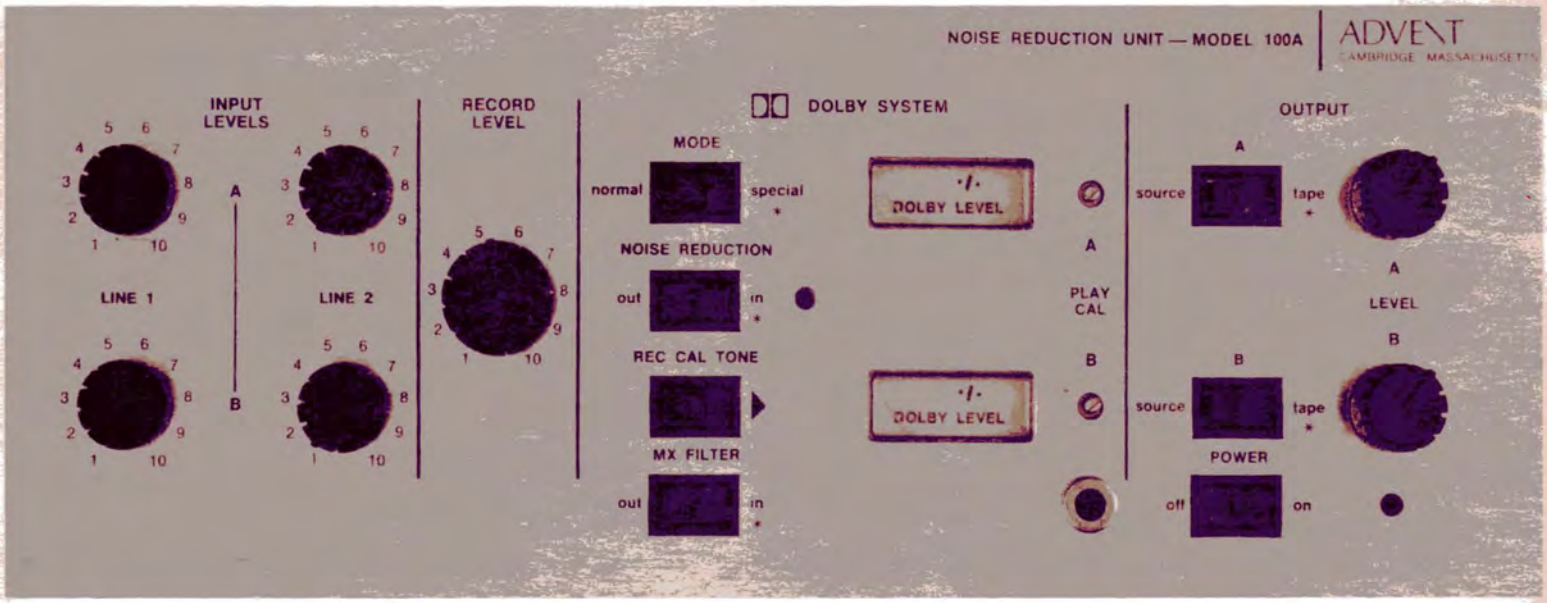
RECORD LEVEL: This is a master level control that is used to set the final recording level of the four individual inputs.

SOURCE-TAPE SWITCHES: These switches take over the function of the source-tape switches of a monitoring tape recorder.

OUTPUT LEVELS: These two knobs control the signal fed from the 100A to an external amplifier or headphones. They replace the function of the playback level controls (if any) on your recorder.

HEADPHONE JACK: This front panel jack can be used to drive headphones of up to 600 ohms impedance.

*A trademark of Dolby Laboratories, Inc.


NOISE REDUCTION UNIT — MODEL 100A
ADVENT
CAMBRIDGE MASSACHUSETTS
INPUT LEVELS
LINE 1
LINE 2
A
B
RECORD LEVEL
DOLBY SYSTEM
MODE
normal
special
*
NOISE REDUCTION
out
in
*
REC CAL TONE
MX FILTER
out
in
*
DOLBY LEVEL
DOLBY LEVEL
A
PLAY CAL
B
OUTPUT
A
source
tape
*
A
LEVEL
B
B
source
tape
*
B
POWER
off
on

Short Form Instructions

Normal Mode

Play Calibration

1. Set the **MODE** switch to **NORMAL.**

2. Set your recorder so that it reads tape output.

3. Play the Dolby Level tape or cassette, and adjust the recorder's output level controls (if any) so that the recorder's output meters read to "0" (or set the recorder's output controls at about 2/3 of their rotation).

4. Adjust the **PLAY CAL** controls on the Model 100A so that the **DOLBY LEVEL** meters read to the Dolby Level line as the tape is being played. Once calibrated, do not change the settings of the recorder's output level controls or the **PLAY CAL** controls on the Model 100A.

Record Calibration

A. Three-head recorders capable of monitoring the tape while recording:

1. Be sure that the output of your recorder is set to "tape."

2. Thread a blank reel of tape onto the recorder. Start the machine recording.

3. Activate the **REC CAL TONE** on the Model 100A. While so doing, adjust your recorder's record level controls until the meters on the Model 100A read to the Dolby Level line.

B. Two-head recorders (including cassettes) which do not allow monitoring the tape while recording:

1. Thread a blank reel of tape onto the recorder. Start the machine recording.

2. Activate the **REC CAL TONE** switch on the Model 100A and adjust the recorder's record level controls so that the **DOLBY LEVEL** meters on the 100A read to the Dolby Level lines, and record 3 or 4 seconds of the tone.

3. Rewind the tape to the beginning of the recorded tone and play it back, noting where the **DOLBY LEVEL** meter reads relative to the Dolby Level line. Repeat step two, readjusting recorder's record level controls depending on whether the **DOLBY LEVEL** meters read below or above the Dolby Level line.

4. Play second recording of the test tone. Repeat this process until **DOLBY LEVEL** meters read to the line when the recording of the tone is played back.

Making Recordings

1. After calibration, do not touch your recorder's output or record level controls, and don't touch the Model 100A's **PLAY CAL** controls. Use only the Model 100A's **INPUT LEVEL, RECORD LEVEL,** and **OUTPUT LEVEL** controls.

2. Use your machine's record level indicators during recording. Do not use the Model 100A's **DOLBY LEVEL** meters as record indicators – they are only for calibration.

Special Mode

Play Calibration

1. Set all controls on the 100A so marked to the "*" positions, and your amplifier's tape monitor switch to "tape."

2. Select the source of Dolby-processed signals (such as FM or the amplifier inputs to which the second deck is connected) on the amplifier's input selector.

3. Calibrate the Model 100A to the source, using a Dolby Level tone from that source. FM stations will broadcast a Dolby Level tone from time to time; if you're using a second recorder, play the Dolby Level tape on it. As the Dolby Level tone from the source is heard, adjust the Model 100A's **RECORD** and **INPUT LEVEL** controls so that the **DOLBY LEVEL** meters read to the line.

Listening and/or Recording

The Model 100A's decoding circuits will now feed the properly-decoded signal back to the amplifier for listening.

At the same time, the Dolby-processed signal will be fed unaltered to the recorder connected to the 100A. Thus, to make a Dolby-processed tape of the source signal, all you need do is to start the deck connected to the 100A recording as you listen. The tape that results should be played like any other Dolby-processed tape, with the Model 100A in the **NORMAL** Mode and the **NOISE REDUCTION** in.

When listening to and/or taping Dolby-processed sources in this way, do not switch the Model 100A's **MODE** selector to **NORMAL.** Also, do not touch the Model 100A's **RECORD** and **INPUT LEVEL** controls, nor any level controls on the tuner and the recorder(s).

The Dolby System Explained

To understand how the Dolby System works and how it achieves noise reduction without altering the music, let's first look at conventional recording, that is, recording without the Dolby System.

Conventional Recording

Music. Music consists of sounds of different loudness separated by intervals of silence. Loud and soft sounds are shown here as long and short lines. The music represented here starts loud and gradually becomes very quiet.

Noise. Any recording tape (even the best "low noise" kind) contains inherent noise, much as even the best photographic film has a discernible "grain."

Music and Noise. When a conventional tape recording is made, the noise of the tape conceals the quietest musical sounds and fills the silences when no sound should be heard at all. Only when the music is loud is the noise not usually heard.

Recording with the Dolby System

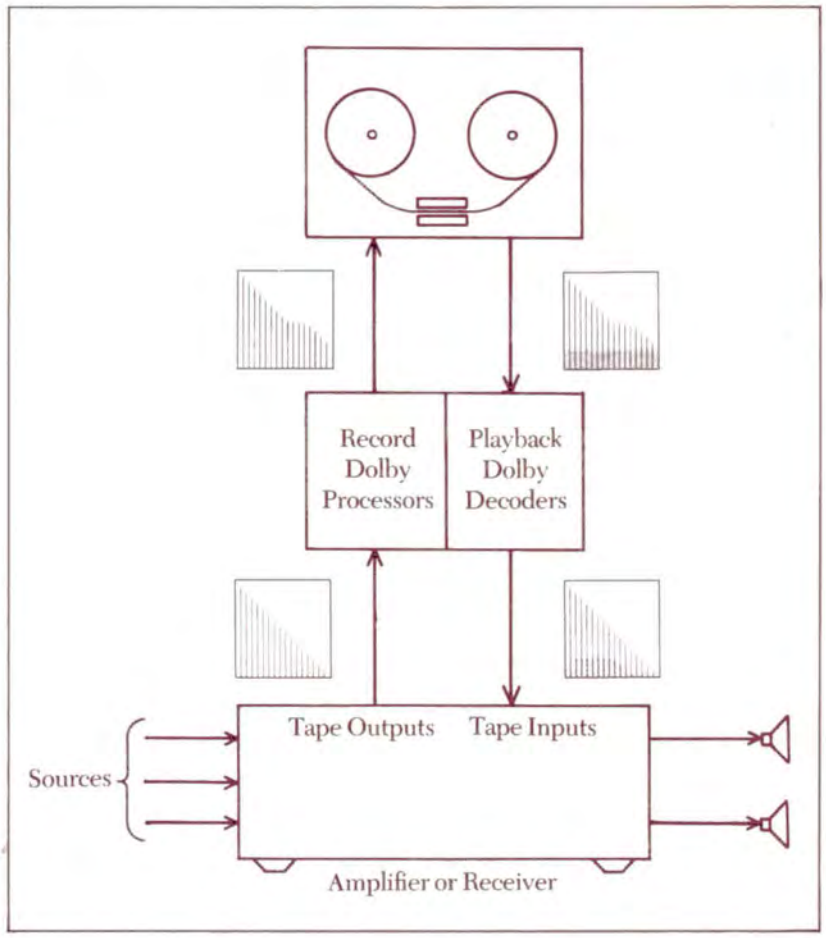
The conventional signal to be recorded passes through the record Dolby processors. Loud parts of the music pass through unchanged. The quieter high frequency portions of the music are automatically made louder, to a degree dependent upon how quiet they are. The quietest high frequencies are increased the most, up to 10 dB. This processed signal is appropriately called *Dolby-processed*, or "Dolbyized."

The recording: When the Dolby-processed signal is recorded onto tape, the parts of the music that have been made louder stand out clearly from the inevitable noise. Such recordings are called *Dolby-processed tapes*.

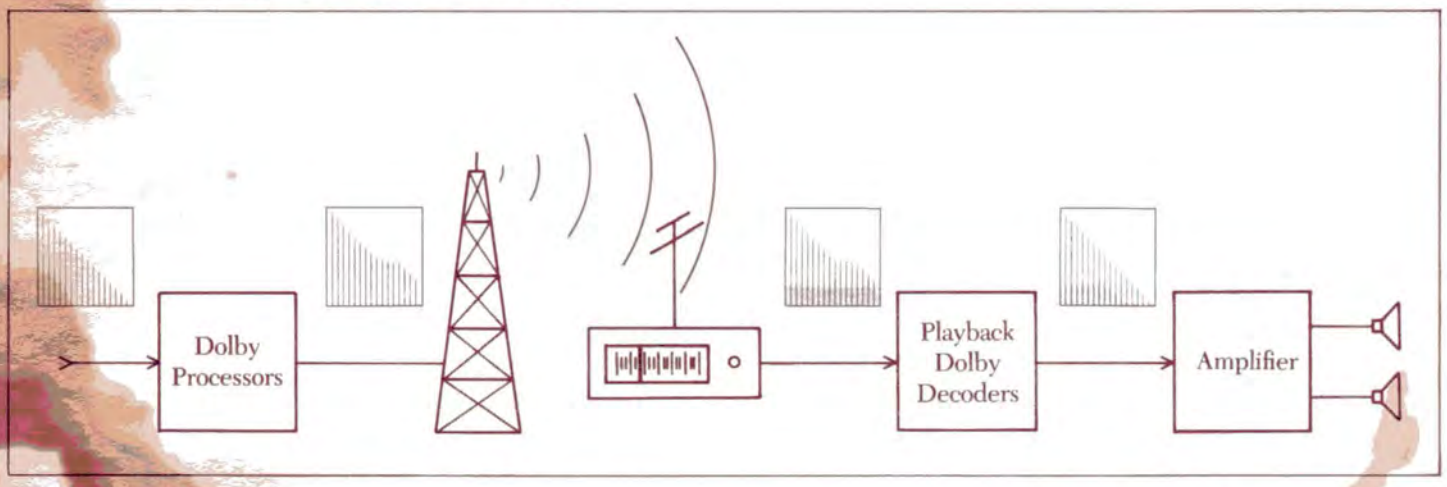
When a Dolby-processed tape is passed through the Dolby playback decoders, the loudness is automatically reduced in all of the places at which it was increased before recording. This restores the music to its original loudness and frequency response. At the same time, the tape noise which has become mixed with the music is reduced by the same amount—usually enough to make it inaudible. The signal from a Dolby-processed tape, after it has passed through the decoding circuitry, is referred to as a *decoded signal*.

Where the Dolby System Connects

The Dolby System is connected between an amplifier or receiver so that signals going to and coming from the recorder first pass through the Dolby circuitry.



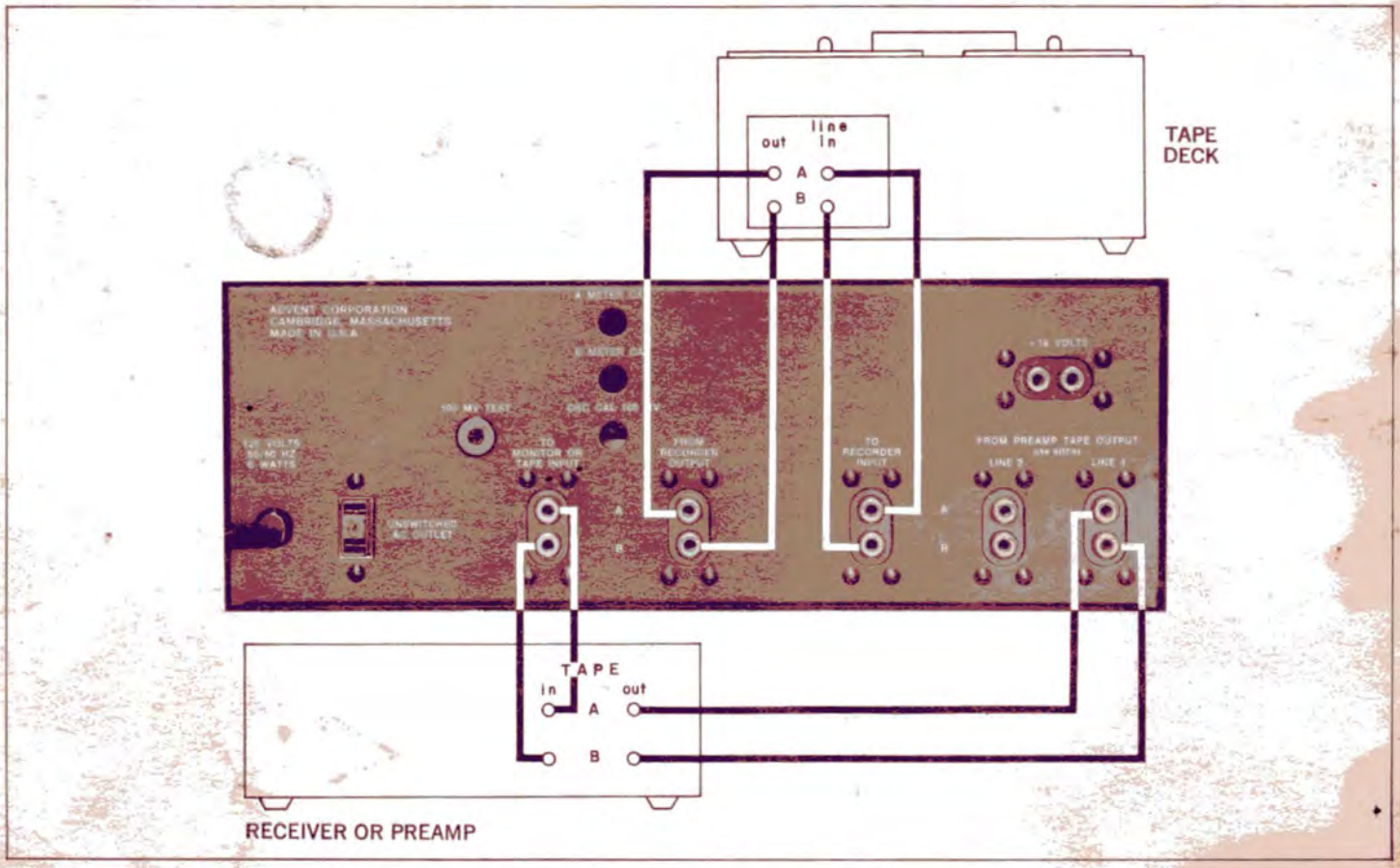
The Dolby System and FM Broadcasting



The Dolby System can also be used to reduce the noise level of FM broadcasts. Whereas in tape recording the source of the noise is mostly the tape itself, in broadcasting the noise results from the transmitting/receiving process and is particularly noticeable on stereo multiplex broadcasts.

Various stations now broadcast a Dolby-processed signal. (Check your local stations for programming details.) When this signal is passed through Dolby playback decoders, noise added during the transmission, as well as noise caused by insufficient limiting by the tuner of weak stations, is automatically reduced.

Connecting the Model 100A to your Audio System



Note: Throughout this manual, all references to the Model 100A's controls and connections will be capitalized. The controls and connections of your other equipment will be in regular type.

1. Turn off the power to your system.

2. Disconnect your tape recorder from your amplifier, preamp or receiver.

The following connections are made at the back of the Model 100A. Channel A means the left channel, Channel B the right.

3. Connect one pair of cables to either the **LINE 1** or **LINE 2** jacks on the Model 100A. Connect the other ends to the tape recording *output* jacks of your music system.

4. Connect another pair of cables to the jacks on the Model 100A labelled **TO MONITOR OR TAPE INPUT.** Connect the other ends to the tape monitor *inputs* of your system.

5. Connect a pair of cables to the jacks on the Model 100A labelled **TO RECORDER INPUT.** Connect the other ends to inputs of the recorder, marked variously "line inputs", "record inputs" or "aux. inputs".

6. Connect another pair of cables to the outputs of your recorder, marked "output", "monitor output" or "preamp output". Connect the other ends to the jacks on the Model 100A labelled **FROM RECORDER OUTPUT.**

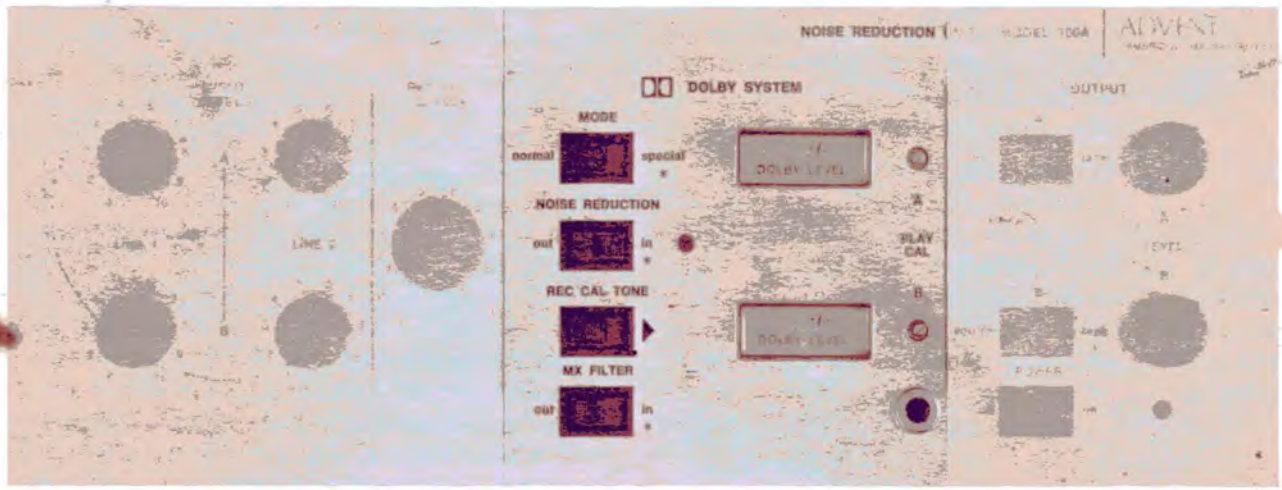
7. Plug the power cord into a 120 volt, 50/60 Hz AC source only. Consult Advent or your dealer for use with other AC voltages.

A word about 4-channel decoders, equalizers, reverb units, etc.

With the growing popularity of such accessory equipment as equalizers and 4-channel decoders, it is easy to become unnecessarily confused when adding the Model 100A to an already complicated system. The majority of these devices connect to the tape monitor jacks of a system and therefore incorporate a replacement set of tape monitor jacks. Thus the above connection instructions would apply to the tape monitor jacks on such equipment, and the Model 100A/tape deck combination should be connected at that point in the system to which you previously would have connected the deck alone. Keep in mind that *no component can be connected between the Model 100A and the tape deck;* however, it does not matter how many accessory devices are connected between your system and the Model 100A.

A final note: The Dolby System in no way interferes with the various 4-channel synthesizing and decoding processes.

Calibration



What this calibration is all about.

As you can see from the earlier description of how the Dolby System works, the noise reduction is accomplished by processing the signal that is fed to the recorder, and then decoding that signal as it comes off the tape at the time of playback. The optimum performance of the Dolby circuits depends on proper matching of the levels to the record and play halves of the system, which are identical circuits used in a mirror-image relationship to each other. An initial set-up and calibration procedure is therefore necessary after the Model 100A and your recorder have been interconnected. Thereafter, certain control settings, including virtually all those on your tape recorder, should not be changed. The instructions will stress which of these controls should not be changed.

Play Calibration

1. Put the Model 100A's **MODE** switch in the **NORMAL** position.

2. If you are using a three-head deck capable of monitoring off the tape while recording, set the deck's source-tape switch to "tape". Be sure to leave this switch in the "tape" position throughout the entire calibration.

3. Thread the Dolby Level tape onto your recorder (or insert the Dolby Level cassette). Set the recorder to the speed at which you will be recording.

4. This step depends on your recorder:

   a. If your recorder has no output (playback) volume controls, go to step 5.

   b. If your recorder has output volume controls, and the meters do *not* read the playback signal, set the output volume controls to about 2/3 of their full rotation. (If you own a Tandberg deck, set the output volume controls all the way up.)

   c. If your recorder has output volume controls and the meters *do* read on playback, play the Dolby Level tape and adjust the volume controls so that the recorder's meters read to "0".

5. Play the Dolby Level tape or cassette. As it plays, watch the Dolby Level meters on the Model 100A, and adjust the Model 100A's **PLAY CAL** controls (using a small screwdriver) so that each meter reads to the large Dolby Level line.

This completes the Play Calibration. From now on, be sure that you do not change the settings of the recorder's output volume controls (if any) or the Model 100A's **PLAY CAL** controls. This calibration is extremely stable and should not have to be repeated, except to periodically check it. If your recorder has output volume controls, we suggest that you mark their setting with a felt tipped pen, or even put household tape over the controls as a reminder not to touch them.

Note: Be sure to treat your Dolby Level tapes with respect. In particular, do not get them close to any strong magnetic fields, such as the amplifier's transformer, head demagnetizers, or speaker magnets. Partial demagnetization may result, thereby lowering the level of the tone on the tape significantly below the established standard for all products and prerecorded tapes employing the Dolby System.

If you lose or damage a Dolby Level tape, you may order a replacement for $2.50. Be sure to specify if you

wish the open-reel Dolby Level tape or the cassette. Send your check and order to:

Customer Service
Advent Corporation
195 Albany Street
Cambridge, Mass. 02139

Record Calibration

This section is divided into two parts. One set of instructions applies to three-head decks capable of monitoring the tape while recording, and the other applies to two-head recorders which use a combined record/play head (such as cassette decks). To avoid confusion, read only the section appropriate to your recorder, and then proceed to the next section, "Notes About Calibration".

A. Three-head recorders capable of simultaneous recording and playback (such as the Sony 366, Revox A-77, or Tandberg 6000, etc.):

1. Leave all controls where they are after Play Calibration. Be sure that your recorder's source/tape switches are still set to "tape", and the 100A's **MODE** switch to **NORMAL.**

2. Thread a blank tape of the type you regularly use onto your recorder, and set it to record. When the tape is moving, slide the spring-loaded **REC CAL TONE** switch on the Model 100A to the right and hold it there.

3. What you are now doing is recording a tone onto the tape from an oscillator built into the Model 100A. While holding the **REC CAL TONE** switch on, watch the Dolby Level meters and adjust your recorder's record level controls until both Dolby Level meters read to the Dolby Level line.

Don't be concerned about where your recorder's meters read during this procedure. It is not uncommon for them to read higher than the point you normally use to indicate overload.

You have now completed the record calibration procedure. From this point on, the only controls you touch on your recorder are those which operate its mechanical functions. All level controls on your recorder must be left alone, except when you want to re-calibrate.

B. Recorders with combined record/play head (such as cassette decks):

1. Leave all controls where they are after Play Calibration. Be sure that the Model 100A's **MODE** switch is still set to **NORMAL.**

2. Thread a blank tape of the type you regularly use onto your recorder and set its tape counter to "0".

Put your recorder into the "record" mode and use the "pause" control to keep the tape from moving.

3. Slide the Model 100A's spring-loaded **REC CAL TONE** switch to the right and while holding it there, adjust the record level control on your recorder so that the Dolby Level meters on the Model 100A read to the Dolby Level line.

4. Release the recorder's "pause" control, continuing to hold the **REC CAL TONE** switch on. Record 3 or 4 seconds of the tone from the 100A's internal oscillator.

5. Rewind the tape back to "0" (where the recording you just made of the tone begins). Play back the recording of the tone, and note where the Dolby Level meters read relative to the Dolby Level line while playing back the recording of the tone. Do *not* change the **PLAY CAL** control settings. The object is to have the Dolby Level meters read between the two dots on either side of the Dolby Level line. If they do, you can skip steps 6 and 7.

6. Reset the tape counter to "0," and record the **REC CAL TONE** a second time, as in step 4 above. This time, before you begin to record the tone, adjust your recorder's record level controls up or down a bit, depending on whether in step 5 the Dolby Level meters read below or above the Dolby Level line. (You will find it easiest to concentrate on one channel at a time.)

7. Play back the second recording of the **REC CAL TONE**, and again note how close the Dolby Level meters read to between the two dots. Repeat this record-play-adjust procedure (step 6) as many times as necessary until the Dolby Level meters read to between the two dots on the *playback* of the recording of the **REC CAL TONE.**

This final adjustment is important, so we suggest that you mark the settings of the recorder's record level controls with a felt-tipped pen.

Note: With some recorders, particularly cassette machines, it may be necessary to set the recorder's record levels so high as to actually pin the recorder's meters to properly accomplish the Record Calibration. Where the recorder's meters read when record calibration is finally accomplished is not important. Calibration is only a level-matching procedure and has nothing to do with the levels at which you normally record music.

You have now completed the calibration procedure. From this point on, the only controls you should touch on your recorder are those which operate its mechanical functions. All level controls on your recorder must be left alone, except when you want to re-calibrate.

Notes About Calibration

This section will answer some of the questions you may have about the calibration procedure. We've also provided some suggestions which may make your use of the Model 100A more satisfying.

1. During the Record Calibration, when you were reading the level of the **REC CAL TONE** coming off the tape, you may have noticed the Dolby Level meters fluctuating slightly. This is usually due to irregularities in the oxide surface of the tape itself. If the recorder's heads are clean, these fluctuations should rarely be more than the range indicated by the two small dots on either side of the Dolby Level line. These dots represent a range of about 2 dB, which is well within the matching level tolerance of the Dolby System. It is rare, even with the best tape, to always be *precisely* on the Dolby Level line. Slight variations are inaudible and you will have to be tolerant of them, as is the Dolby System.

However, if the meter fluctuations are persistent and large, that is, well below the left hand small dot on the meter, we suggest that you not use that reel of tape. Fluctuations of this sort indicate tape "dropout" that would be audible on any recording you made.

Before deciding to reject such a tape, however, be sure that the recorder's heads are thoroughly cleaned according to the manufacturer's instructions. Build up of oxide on the heads can cause the same kind of fluctuations we've been talking about.

Also, you may notice significant fluctuations of the Dolby Level meter on Channel A, but not on B. This indicates that the particular reel of tape may have been heavily used, and that its top edge is frayed, causing poor tape-to-head contact on the upper (A) channel. Another possible source of meter fluctuation may be incorrect threading of the tape, particularly on those recorders which use tension arms to maintain good tape-to-head contact.

2. If you own a three-head recorder capable of monitoring the tape while recording, and if you are concerned with getting the last ounce of performance from your recorder and the Model 100A, we suggest that you make a quick Record Calibration for each reel of tape that you use. It takes only a few seconds.

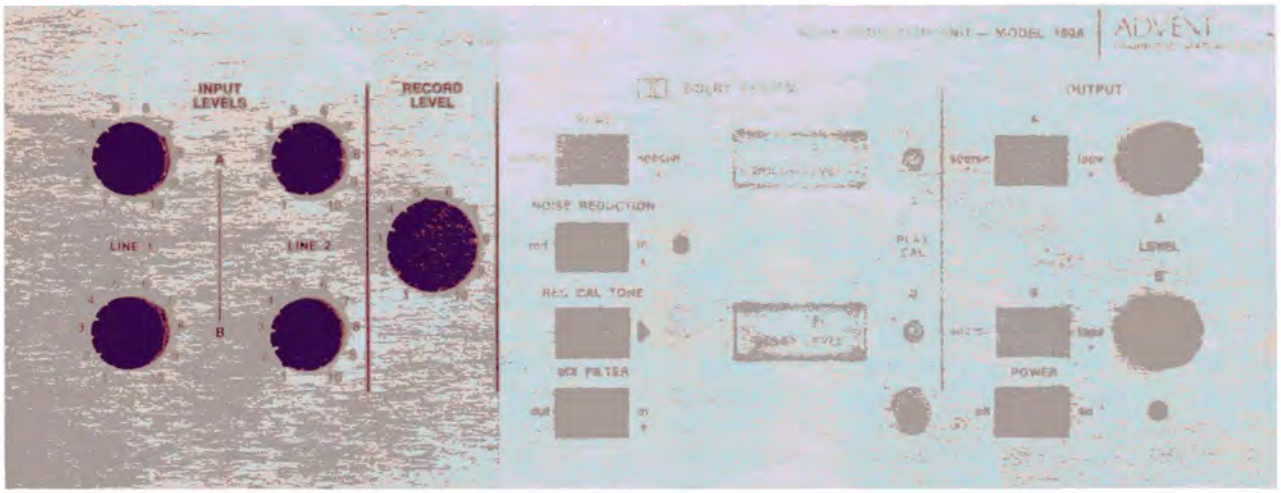
If you decide to do this, we'd also suggest one further step. After you do the Record Calibration for a particular reel, we suggest that you actually leave 10 seconds or so of the **REC CAL TONE** at the beginning of the tape. Having this tone at the beginning of the recording will greatly facilitate making a copy of the tape later, using the method described on page 15.

If you have a recorder which does not allow you to monitor the tape with a separate playback head, we doubt it would be worth the trouble to re-calibrate with every reel, if you stick to the same type and brand of tape. However, if you change to another type or brand of tape, you should re-calibrate.

3. Once you have successfully completed the Record Calibration, you have essentially duplicated the Dolby Level tape supplied with the Model 100A. Therefore, by simply repeating the Record Calibration you can make your own Dolby Level tape of any length desired. Remember, however, that if your recorder is quarter track, this homemade Dolby Level tape is not suitable for use on half track and full track machines and *vice versa*.

4. Remember that if Play Calibration requires readjustment, you must then check the Record Calibration again. Also, any time you decide to fully calibrate your recording system, the Play Calibration always precedes the Record Calibration.

Recording Instructions



A Word about the Controls

When making a recording, use only the **INPUT LEVEL, RECORD LEVEL,** and **OUTPUT LEVEL** controls on the Model 100A to adjust recording and playback volumes, not the record and output level controls on your recorder. Your recorder's level controls must be left exactly where you set them during calibration. If you inadvertently disturb the recorder's controls, you will have to go back and re-calibrate.

When making a recording, use your recorder's record level indicators to set levels, not the Model 100A's Dolby Level meters, which are only used for calibration.

When using only one pair of **LINE** inputs, turn the **INPUT LEVEL** controls for the unused pair all the way down (counterclockwise).

Finally, be sure that the 100A's **MODE** switch is set to **NORMAL.**

Adjusting for Proper Stereo Balance

The right stereo balance is an often overlooked step in making a recording with the same apparent overall sound quality as the original. The following sequence will help you set stereo balance for consistently best results.

1. Set your recorder so that its meters will read the incoming signal (this may necessitate putting it into the record mode). Set the Model 100A's **RECORD LEVEL** control at about number 7 for now.

2. Select a monophonic record (or broadcast). The best choice is one with a steady tone or with long passages of fairly steady loudness. While playing this mono material, adjust the appropriate **INPUT LEVEL** controls so that both meters on the recorder read to the same point on both channels.

When you have done this, the two channels are in reliable balance for recording in almost all cases. The two **INPUT LEVEL** controls at this point may not be in identical position. It's a good idea to mark their positions by a light mark with a felt-tip pen for future convenience since the above procedure will rarely require repeating.

Setting Final Recording Levels

From now on to set final recording level you need use only the master **RECORD LEVEL** control, which will raise or lower the recording level for both channels simultaneously.

Your experience, experimentation, and your recorder's instruction manual will all help you to find the best overall recording level, sampling the source material's loudest passages to make this setting.

The Other Controls

- If you are taping an FM stereo broadcast, switch the **MX FILTER** in. Always use this filter when recording a stereo broadcast because the 19 kHz multiplex pilot tone, although inaudible, may actuate the Dolby System circuits in such a way as to cause insufficient noise reduction or improper Dolby System action.

- Switch the **NOISE REDUCTION** in. (If you wish to make a recording without the Dolby System, leave the switch out.)

- If you have a three-head recorder capable of simultaneous recording and playback, you can monitor the tape while making the recording. Leave the tape monitor switch on your amplifier in the monitor (tape) position, and leave your recorder's source-tape switches to "tape."

You can now compare the source to the recording by switching between **SOURCE** and **TAPE** on the Model 100A. By using the Model 100A's **SOURCE-TAPE** switches, the source and tape will be at precisely the same level, which is a necessity when checking the tape for discrepancies from the source.

• Set the **OUTPUT LEVEL** controls to suit. It is a good idea to set them to approximate the level of your other sources, such as a tuner or turntable. This often requires setting the **OUTPUT LEVEL** controls at or near their full clockwise position.

Recording with Microphones

Making "live" recordings with microphones and the Model 100A requires the use of an accessory microphone preamp, the Advent MPR-1. This preamp is designed specifically for recording with low impedance microphones, and is a truly high-performance device of wide frequency range and low noise. The inputs permit microphones to be connected in a balanced (as well as unbalanced) configuration, which will allow for the use of long mic cables without the risk of picking up hum and RF interference.

The MPR-1 also provides a switch to select either 40 or 60 dB of gain, so that it can be used with a wide variety of microphones under a wide variety of placement conditions. Its cost is moderate because it is designed to be powered by an external power supply, such as that in the Model 100A. However, the cost of building into the Model 100A a versatile and high performance mic preamp was considered high enough to be an unnecessary burden on those not interested in live recording.

The MPR-1 is a stereophonic preamp, for recording with two microphones. It connects to either of the jacks on the back of the Model 100A marked **+18 VOLTS**, and its outputs connect to either pair of the Model 100A's **LINE** inputs. A second MPR-1 may be used, thereby allowing full control and mixing of four microphones, two on each stereo channel.

The MPR-1 comes with complete instructions for its use, including suggestions and tips for "live" recording. Written originally for using the MPR-1 with the Advent Model 201, the instructions apply equally to the Model 100A.

Mixing

The Model 100A's **LINE** inputs are truly mixable, that is, all four inputs are completely isolated from each other, and there is no interaction between the four **INPUT LEVEL** controls.

As a result, the Model 100A will add mixing facilities to those recorders which lack them. If your recorder already has mixing facilities, the 100A usurps them, because all signals must pass through the 100A for Dolby-processing before they reach your recorder.

The Model 100A can be used to mix two stereo pairs of high level signals; mic-line mixing can be accomplished with the use of the MPR-1 microphone preamplifier plugged into one pair of **LINE** inputs; or four-microphone mixing can be accomplished with two MPR-1's.

Adjusting the **LINE 1** and **LINE 2 INPUT LEVEL** controls allows you to adjust the relative balance of the two sources you're mixing together. Once you achieve the desired balance between the sources, use the master **RECORD LEVEL** control to set the overall record level of the mixed signal going onto the tape.

Monophonic Recording

All the calibrating, recording, and playback instructions we've supplied apply equally to monophonic recordings, except of course for those instructions such as balancing channels which obviously apply to stereo recording. You'll find that the level controls of the Model 100A are handily laid out for mono recording, as you will simply be using one horizontal row of controls—A or B—at a time.

If you have a quarter-track recorder and are recording monophonically on each of the four tracks individually, just remember to change your focus of attention from the A row of controls to the B row (and vice versa) when you change corresponding tracks on the recorder.

Sound-on-Sound Recording

Sound-on-sound recording with the Model 100A can be accomplished with any stereo tape recorder which 1) has a separate playback head for monitoring and 2) allows each stereo channel's record function to be activated separately.

By sound-on-sound recording, we mean that process whereby previously recorded monophonic material on one channel can be transferred to the other, while a new monophonic signal from a microphone is added to the previously recorded material. Thus the use of an MPR-1 microphone preamp is required.

Note: If your recorder has built in sound-on-sound switching, do not use that switching. If you did, it would mean that the Dolby processing would not be properly applied to the signal during the various steps of the sound-on-sound process. Leave the sound-on-sound switch of your recorder in the "normal" or "off" position.

The following instructions assume that 1) the MPR-1 is connected to the **LINE 2** inputs of the Model 100A, and 2) that the material previously recorded is on the A or left (upper) track of the tape and is Dolby-processed.

1. Headphones are necessary for sound-on-sound recording, particularly if you yourself will be using the microphone.

2. Connect the A channel jack on the 100A marked **TO MONITOR OR TAPE INPUT** to the **B** channel jack marked **LINE 1.**

3. Plug the microphone into the B (right) channel of the MPR-1 (be sure the MPR-1's B channel output is connected to the B channel **LINE 2** input of the Model 100A).

4. Switch the **NOISE REDUCTION** in.

5. Set the source-tape switches on the recorder to "tape". On the Model 100A, set the Channel **A SOURCE-TAPE** switch to **TAPE** and the Channel **B SOURCE-TAPE** switch to **SOURCE.**

6. Set the Channel **A OUTPUT LEVEL** control to provide sufficient level over the headphones. Do not change this setting once you begin to record, as it will affect the record level on Channel **B.**

7. Start the recorder, activating the record function on Channel **B** only. As the tape moves, you will hear the original material recorded on Channel **A** over one earphone, and the *mix* of the original and new material from the microphone over the other earphone. The level of the mixed signal will be dependent upon the Channel **B LINE 1** and **LINE 2 INPUT LEVEL** controls and the **RECORD LEVEL** control.

As you add the new material, adjust the Channel **B LINE 1** and **LINE 2 INPUT LEVEL** controls to a point which sounds right while concentrating your attention on the mixed signal.

This is difficult, because you will hear over the other channel the original material recorded on Channel **A.** It's further complicated if you yourself are using the mic to add the new material while trying to listen to the phones. Therefore we suggest that you make a trial recording, and listen to the playback of the mixed signal on Channel **B** alone to see if you've established the right balance between the original and new material.

Note: While recording, be sure to leave the Channel **B SOURCE-TAPE** switch in the **SOURCE** position, or you will hear over one earphone the mixed signal out of synchronization with the original **A** track.

8. This sound-on-sound process may be repeated, taking what's now on the **B** channel and transferring it to Channel A along with something new again. One of the advantages of the Dolby System is that it allows for this process to be repeated several times, permitting "over-dubbing" without a great deal of hiss buildup.

If you are confused as to how to transfer from **B** to **A**, here's a brief rundown of how you would now reverse the **A** to **B** process:

a) Connect the **B** channel jack marked **TO MONITOR OR TAPE INPUT** to the **A** channel jack marked **LINE 1.**

b) Plug the mic into the MPR-1's **A** (left) channel.

c) Set the B channel **SOURCE-TAPE** switch to **TAPE** and the A channel to **SOURCE.**

d) When recording, activate only the **A** channel of the recorder.

Recording Tips

These tips in capsule form are intended to make your recordings and your use of the Model 100A as satisfying as possible. They are based on both our own experience and our knowledge of common pitfalls people experience in making recordings.

• Set the **NOISE REDUCTION** switch to **IN** for all the recordings you make. Remember that to effect the noise reduction properly, this switch must be **IN** *both* when the recording is made *and* when it is played back. Unless you have some specific reason for making a recording without the Dolby System, about the only time to have the **NOISE REDUCTION** off is to play back a tape recorded without the Dolby System.

• It is good practice to always clean your recorder's heads, capstan, and pinch roller before attempting a recording.

• Proper use of the pause control of your recorder before beginning a recording will enable you to record all the music you want without missing a note. The proper sequence is to put the arm on the record, then release the pause control about 2-3 seconds before the music starts.

• Another useful technique is "fading" the **RECORD LEVEL** control up and/or down. For example, let's say that you have determined that a setting halfway between 6 and 7 for the **RECORD LEVEL** control is proper for a particular record. You might for a special effect want the music to fade in or fade out. To fade in the music, you would start the recording with the **RECORD LEVEL** control at 0 and with one continuous, smooth motion rotate the control to 6½. To fade out the music, you would go from 6½ to 0 in one continuous motion.

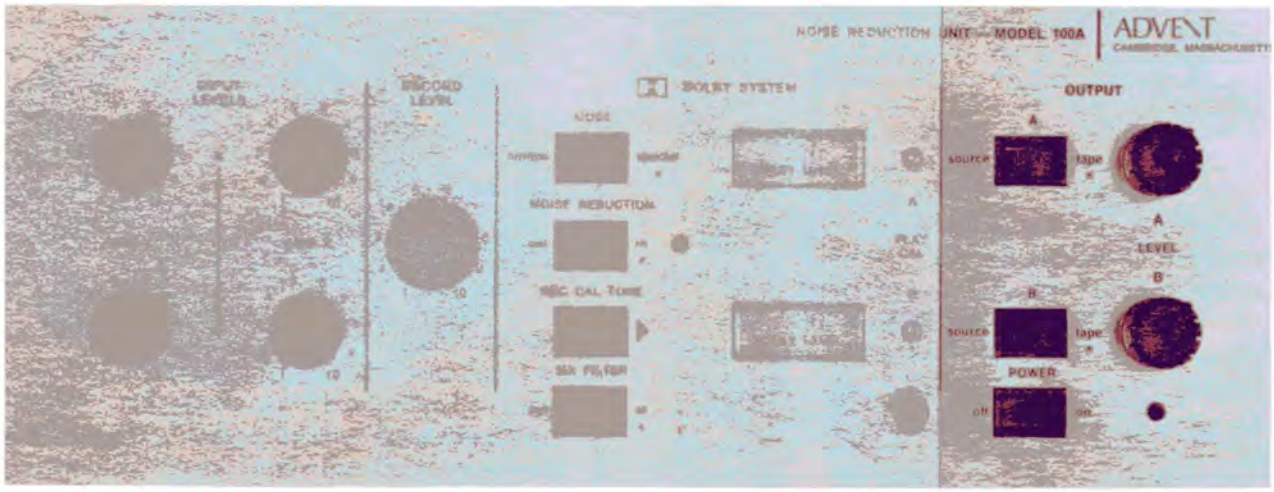
• Remember that when making stereo recordings the two channels will often read differently. If you have set the balance with the **INPUT LEVEL** controls as we've suggested, "stick to your guns" and don't be tempted to readjust the individual levels after you've begun recording; the recordings will come out with the proper stereo balance. Use only the **RECORD LEVEL** control to readjust overall recording levels for different material.

• Set the final overall record levels by sampling the loudest passages (whenever possible) before beginning a recording. On records you can tell the loudest parts by looking at a record under light: the most heavily modulated grooves (the loudest parts) break up the light more, or conversely reflect light less well than the soft passages, which will appear smoother.

• A proven technique that you can use to determine proper record levels is to make a short 15-30 second trial recording of the loudest passages of the material to be recorded. This technique will help you to avert the disappointment of a distorted recording and accelerate your experience in determining the optimum record levels for various kinds of music.

• When in doubt, it is always preferable to underrecord, that is, use a slightly lower reading on the meter, than to overrecord. The penalty of overrecording is distortion, of underrecording—noise. Because of the substantial reduction in hiss effected by the Dolby System, it is always preferable to err in the direction of underrecording so that you can record even the loudest passages without overloading the tape.

Playback Instructions



1. The **SOURCE-TAPE** switches should be set to **TAPE.** The **OUTPUT LEVEL** controls should be set to your preference.

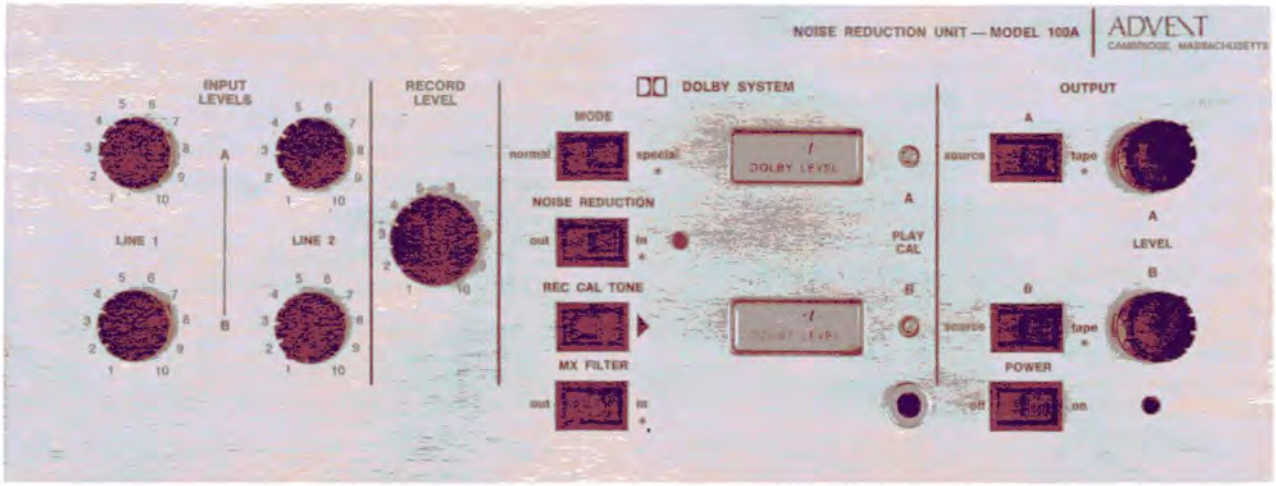
2. The **NOISE REDUCTION** switch should be set to **IN** or **OUT** depending on whether or not the tape to be played is Dolby-processed.

If you're playing a Dolby-processed tape which has a Dolby Level tone recorded on it at the beginning, play the tone and note where the Dolby Level meters read. If they read within the range indicated by the two dots on either side of the Dolby Level line, no adjustments are needed. If, however, the meters read outside that range (which is unlikely), the **PLAY CAL** controls should be readjusted so that the meters read to the line. This will ensure a perfect match of the decoder within the Model 100A to that specific Dolby-processed tape. If it is necessary to readjust the **PLAY CAL** controls for a particular tape, after playing that tape be sure to set them back to where they were, using the Dolby Level Tape.

3. *A special note about playback:* If you read our description at the beginning of the manual of how the Dolby System works, you can see that on playback the Dolby decoder selectively lowers the high frequencies at low levels which had been previously boosted by the encoding process. Although the Dolby System was not designed for this purpose, we have found that by switching on the **NOISE REDUCTION** when playing some conventional (non-Dolby-processed) tapes, this selective lowering of high frequencies can be used to advantage. If you have tapes such as recordings of 78 RPM records or intolerably hissy prerecorded conventional tapes where you wouldn't object to some loss of highs, the Dolby decoder can act as a selective and pleasant noise filter.

It should be understood that no device used only for playback, including the Dolby System, can filter the noise already existing on a conventional (non-Dolby-processed) recording without in some way altering the musical integrity of the signal on the recording. However, because the Dolby decoder will filter the highs only at low levels, and because you cannot hear it act (only the results of its action), we suggest that you use the decoder as a sophisticated noise filter on some of your noisier conventional tapes.

Special Mode of the Model 100A



The **SPECIAL** Mode enables the 100A's decoding circuits to be used for decoding Dolby-processed signals from sources other than the tape deck connected to the 100A: sources such as Dolby-processed FM broadcasts or Dolby-processed tapes played on another deck connected to the audio system. At the same time, Dolby-processed tape copies from these other sources may be made on the recorder connected to the Model 100A.

About the SPECIAL Mode

In the **SPECIAL** Mode, any Dolby-processed signals connected to the **LINE INPUTS** of the Model 100A are fed simultaneously to the tape recorder for copying and to the playback Dolby decoders for listening. Furthermore, the record Dolby-processors are switched out automatically, regardless of the position of the front-panel **NOISE REDUCTION** switch, thereby enabling proper copying of the Dolby-processed signal.

Decoding Dolby-processed FM broadcasts

No change in connections is required when you wish to use the Model 100A for decoding Dolby-processed FM broadcasts. Once the controls are properly set, the signal from your tuner will be fed through the Model 100A's decoding circuitry, and then back to your amplifier and speakers.

Calibration

From time to time, a station broadcasting Dolby-processed signals will transmit a Dolby Level tone for calibration purposes. This broadcast tone is the equivalent of the Dolby Level tape for tape recording; that is, calibrating to the broadcast tone will allow the Model 100A to properly decode the broadcast signal:

1. Select the FM tuner on your amplifier's input selector.

2. Set the amplifier's tape monitor switch to "tape."

3. Switch all controls so marked on the Model 100A to the "*" positions (the **MODE** switch to **SPECIAL**, **NOISE REDUCTION** to **IN**, etc.).

4. When the station broadcasts the Dolby Level tone, adjust the Model 100A's **RECORD LEVEL** control so that both Dolby Level meters read to the line. (If both meters do not read to the line, adjust the appropriate **INPUT LEVEL** so that they do.) Once this is done, the calibration is complete.

We suggest that you mark the settings of the **INPUT** and **RECORD LEVEL** controls on the panel of the Model 100A so you can duplicate the proper calibration for any Dolby-encoded FM broadcasts. This one setting should be correct for any station broadcasting Dolby-processed signals.

Notes: 1. You will find that these settings of the **INPUT** and **RECORD LEVEL** controls are also the proper ones for recording virtually any FM broadcast, Dolby-processed or conventional. Of course, for recording conventional FM broadcasts, you must follow the **NORMAL** mode instructions earlier in this manual.

2. This calibration procedure is entirely independent of, and in no way interferes with, the **NORMAL** Mode calibration of your tape recorder and the Model 100A.

Listening to and/or taping Dolby-processed broadcasts.

At any time, you can listen to and simultaneously record Dolby-processed broadcasts simply as follows:

1. First be sure that your recorder is properly calibrated to the Model 100A as described in the instructions for the **NORMAL** Mode.

2. Select the FM tuner on your amplifier input selector, and set your amplifier's tape monitor switch to "tape."

3. Set all the switches on the Model 100A to the "*" positions.

4. Set the 100A's **INPUT** and **RECORD LEVEL** controls to the previously marked FM-calibration positions.

Your system is now set for listening to decoded Dolby-processed broadcasts. At any time, you may tape a processed broadcast simply by starting your recorder. While listening to and/or taping a Dolby-processed broadcast, be sure not to disturb the Model 100A's **INPUT** and **RECORD LEVEL** controls, and the output level controls on the FM tuner (if any).

The resulting tape should be played back like any other Dolby-processed tape, with the Model 100A in the **NORMAL** mode and the **NOISE REDUCTION** in. When the tape is played back, the decoding process reduces both the noise of the broadcast and that added by the taping.

Note: If you are recording in the above manner on a three-head deck, you will not be able to monitor the tape while recording, because in the **SPECIAL** mode, the **TAPE** position of the **SOURCE-TAPE** switches feeds the decoded source signal back to the amplifier, *not* the signal from the tape recorder (as is the case in the **NORMAL** mode). In the **SOURCE** position, you will hear the Dolby-processed source, without decoding.

Be sure not to change the **MODE** swtich to **NORMAL** when taping a Dolby-processed broadcast. Were you to do so, "double" Dolby-processing would occur to the signal (the already-processed broadcast would pass through the Model 100A's record processors), and a strange-sounding tape would result. Furthermore, this "double" processed signal would be undecodable back to a conventional signal.

Decoding and copying Dolby-processed tapes played from a second tape deck.

The Model 100A can be used to decode Dolby-processed tapes played on another deck connected to the appropriate auxiliary inputs of your amplifier or receiver. (To *record* on more than one deck, consult the Appendix.) At the same time, the deck connected to the Model 100A can be used to make copies of such tapes. No change in connections is required.

Once the controls are properly set, the signal from the second deck will be fed through the 100A's decoding circuits and back to the amplifier for listening; simultaneously, the signal from the Dolby-processed tape playing on the second deck will be fed unaltered to the deck connected to the Model 100A for making a Dolby-processed copy.

1. Select the appropriate auxiliary position on the amplifier input selector for the second deck.

2. Set the amplifier's tape monitor switch to "tape."

3. Set the Model 100A's **MODE** switch to **SPECIAL**, and all controls except the **MX FILTER** so marked to the "*" positions.

4. If the tape to be played and/or copied has a Dolby Level tone on it, thread it onto the second deck. If not, thread the Dolby Level tape onto the second deck.

5. Play the recorded Dolby Level tone. As it plays, adjust the Model 100A's **RECORD LEVEL** control so that the Dolby Level meters read to the line. If both meters don't read to the line, adjust the appropriate **INPUT LEVEL** control so that they do.

6. If steps 4 and 5 required the use of the Dolby Level tape, remove it from the second deck and thread onto it the tape to be copied.

7. Play the tape. If you wish to make a copy, simply start the deck connected to the Model 100A recording at the same time. When listening to and copying Dolby-processed tapes, do not adjust the Model 100A's **RECORD** and **INPUT LEVEL** controls, or any level controls on either recorder. This is essential to ensure proper decoding of the tape for listening as it plays, and to ensure that the Dolby-processed copy will be made at precisely the same level as the original.

The resulting tape copy should be played back like any other Dolby-processed tape, with the Model 100A in the **NORMAL** mode. When the copy is played back with the **NOISE REDUCTION** in, the decoding process reduces the noise of both the original tape and that added by the copy.

Notes on copying Dolby-processed tapes:

1. If you are in the habit of putting a Dolby Level tone on your tapes, do so after completing step 5 above by copying the recorded tone as it plays on the second deck.

2. If you are making the copy on a three-head deck connected to the 100A, you will not be able to monitor the tape while recording.

3. Be sure not to change the Model 100A's **MODE** switch to **NORMAL** while copying a Dolby-processed tape.

In the period of time that we've been investigating tape recording and the Dolby System, there have been innumerable questions we've been asked, or asked of ourselves. Since tape recording in general, and the Dolby System in particular, are something of a mystery to many people, we'd like to share some of these questions with you in this section. We hope that our answers will be of use to you, and help make tape recording more enjoyable for you.

Some Often-asked Questions and Answers about the Dolby System.

1. Does the Dolby System improve the source that's being recorded, or tapes recorded without the Dolby System?

No. There is no known device which can remove noise retroactively from a recording or broadcast without affecting frequency response. In order to work without such side effects, the Dolby System must be used when the recording or broadcast is made, as well as when it is played back. The Dolby System cannot improve your records, broadcasts, or tapes that are not Dolby-processed, without affecting the frequency response. (See the *Playback Instructions* in this manual for suggestions on using the Dolby System as a selective noise filter in some instances.)

What the Dolby System *does* do is to reduce the noise which is otherwise added by the tape recording process, with no side effects. This allows you to make dramatically more accurate copies of a source than would otherwise be possible, but it can't improve upon that source.

2. What about the Dolby System and compatibility?

Some people we've talked to are under the impression that Dolby-processed tapes are somehow "unplayable" on tape recorders without the Dolby System. It's not true.

If you play a Dolby-processed tape without a playback Dolby circuit, you will, of course, get no noise reduction. The other effect is that, particularly on quiet passages, the tape will sound brighter than normal. This brightness is of such a degree that many people wouldn't even notice it, without a direct comparison to the source from which the tape was made, or to the tape played back with a Dolby circuit. If you loan one of your Dolby-processed tapes to a friend who does not have a tape recorder using the Dolby System, you might suggest that he play it back with a slight treble cut.

Perhaps the most meaningful answer to this question is simply for you to play back one of your Dolby-processed tapes with the **NOISE REDUCTION** switch out, and hear for yourself.

3. Doesn't the Dolby System reduce noise by cutting the high frequencies?

You can see from our description of the Dolby System that this is *not* how it works. However, we've found that there's a persistent misconception about the Dolby System's effects on high frequencies, a misconception even among technically sophisticated people.

There are several reasons for this misconception. First of all there is the simple fact that the Dolby System is still a new concept to many people who do not know how it works, and who assume that it must work like all other previous attempts at noise reduction, that is, by filtering.

The second reason is more significant. Because we have all grown up with some sort of music-reproducing machines in our lives, we've all come to associate the presence of noise as an indication that high frequencies are present. Conversely, when noise is removed, we think for psychoacoustic reasons that the highs must have been reduced. If you have a tape recorder capable of source-monitoring, have you ever compared the source to its slightly hissy copy and thought that the tape copy was brighter than the original? This is the same psychoacoustic phenomenon in reverse.

There is yet another reason for this misconception, one which you may have observed yourself with the Model 100A when switching the Dolby System in and out while making a recording on a tape recorder capable of source-tape monitoring. When you switch the Dolby System in while monitoring the tape, you will notice that there is an actual momentary dulling of the highs. This is caused by the fact that when you switch the Dolby System in, a very short length of non-Dolby-processed tape between the record and playback heads is played through the playback Dolby circuit. As a result, the higher frequencies on this short length of tape, since they were not previously boosted by the record Dolby circuit, will be audibly cut back by the playback Dolby—you are using only one-half of the Dolby System for that short stretch of tape.

Conversely, if you switch the Dolby System *out* while monitoring the tape, the opposite effect occurs: there is a momentary brightening of the highs due to the fact that the short length of tape between the record and play heads will be Dolby-processed, but will be played back without the Dolby circuit.

4. Are there any disadvantages to the Dolby System?

Yes, there is one "disadvantage" to the Dolby System, which is actually a blessing in disguise: The Dolby System will show up a significant irregularity in a recorder's frequency response. In particular, if your recorder has a gradually rising or sloping-off high

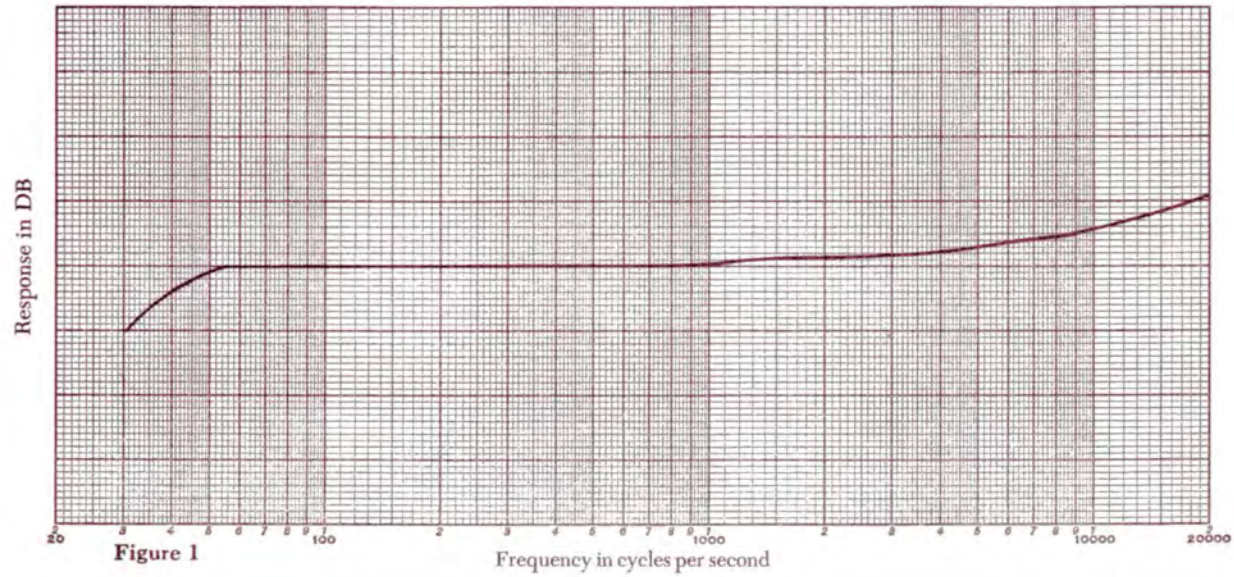


Figure 1

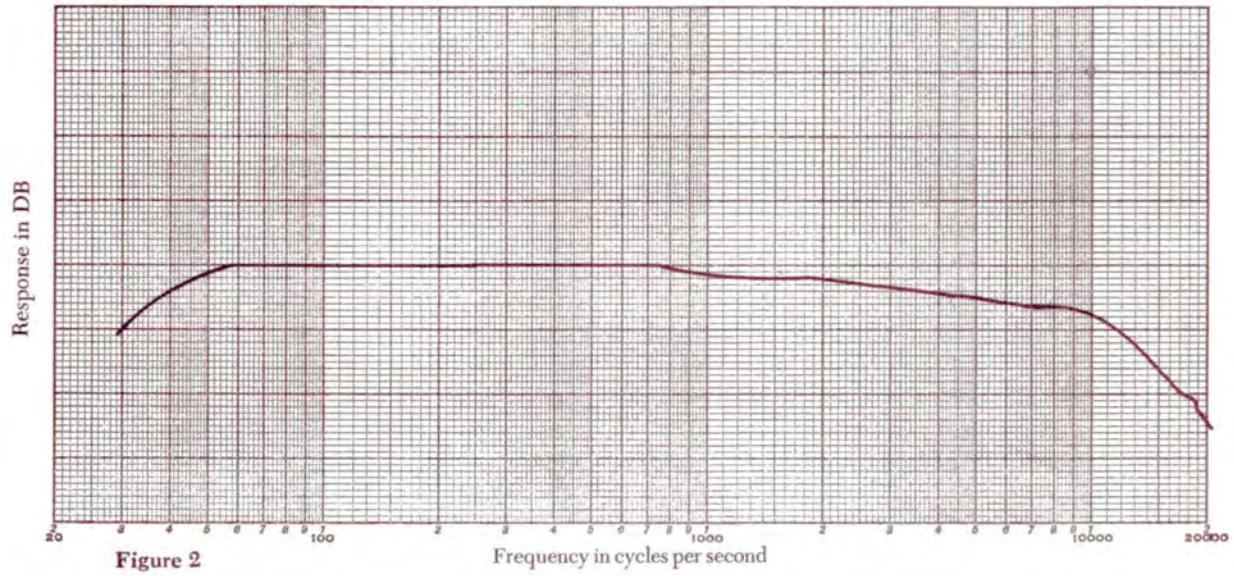


Figure 2

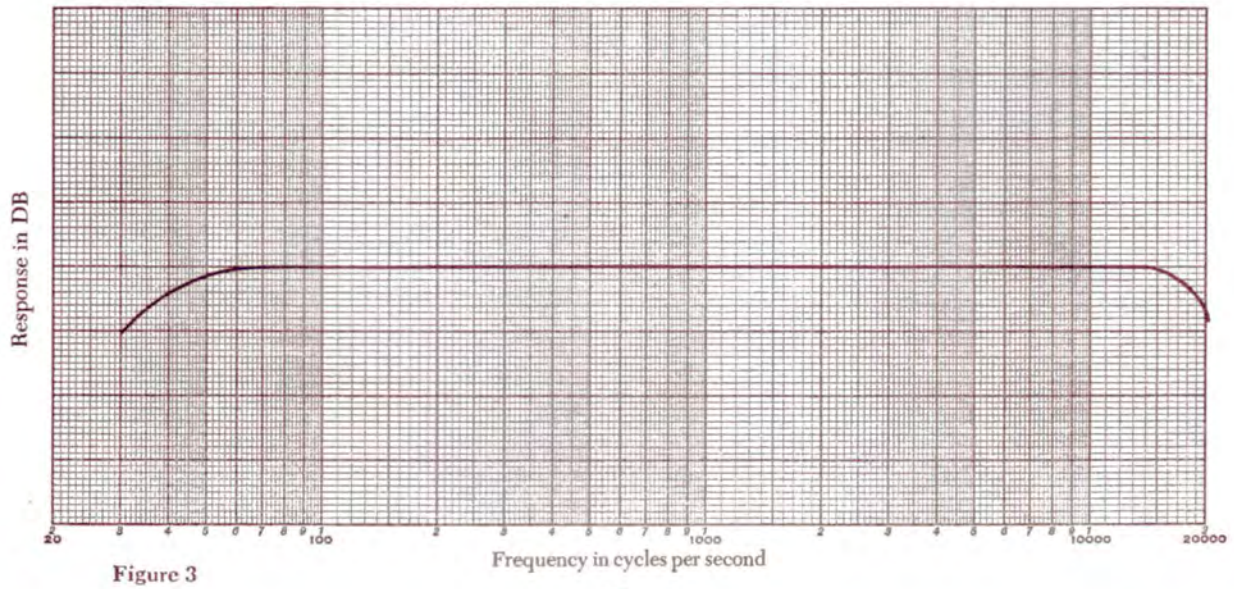


Figure 3

frequency characteristic, you may notice it for the first time when using the Dolby System in the Model 100A.

In many instances, such non-linearities go unnoticed without the Dolby System. One reason that the Dolby System makes them audible has to do with the removal of the tape hiss: if for example your recorder had a gradually sloping-off in the highs, the hiss on the tape would tend to mask the rolloff, due to the psychoacoustic phenomenon we discussed in answering number 3, above. By removing the hiss by means of the Model 100A, the noise no longer masks the rolloff which may be there.

The obvious solution to this problem is quite clear—the recorder should have a flat high-frequency characteristic. It is highly unlikely that any irregularities which might now exist in your tape recorder are due to the quality of the recorder itself (assuming its heads are not worn). More often than not, they are due to the recording bias current not being optimum for the kind of tape you're using. The amount of bias required changes significantly with the type of tape, most distinctly between standard formulations and the low-noise type. By the way, we have found audibly incorrect bias setting even on those recorders which are supposed to be factory-adjusted for a particular kind of tape.

The solution is both simple and inexpensive. If you wish to assure yourself that you're getting the last ounce of performance of which your recorder and the Model 100A are capable, then take your recorder, and a reel of the type of tape you intend to stick to using, to a competent tape recorder technician. Ask him to adjust the bias of your recorder for the *flattest possible high-frequency response.*

In order to show you what effect incorrect bias can have, on the next page we've provided frequency response curves of a good home tape recorder at 3¾ ips. Figures 1 and 2 show variations due to improper bias for a given kind of tape which are large enough to be audible when comparing source to tape. Figure 1 shows the effect of too little bias current for the tape being used, and figure 2 shows what happens with too much bias. Figure 3 shows the results of optimum bias, and indicates that a careful source-tape comparison would reveal no audible change in frequency response between source and tape when using the Dolby System.

5. What kind of tape should be used?

In order to get the best possible performance, we recommend that you use the best quality tape. Along these lines we have two specific suggestions.

First, we recommend that you avoid the unbranded "white box" tape available at many dealers. Although some of this tape can be quite good, you take too big a risk in using it. The problems of the poorer types can be both mechanical, such as the coating's flaking off and causing undue head wear, and sonic, such as audible drop-outs.

Of the first quality tapes available, we suggest that you try the so-called "low-noise" formulations. This kind of tape is capable of a 3 db improvement in signal-to-noise ratio, and every bit helps, particularly at low speeds. There are also the very newest types of low-noise tape which can be even better. The slightly higher cost is overwhelmingly offset by the fact that if you use 3¾ ips for most of your recording, as we predict you will with the Model 100A, your raw tape costs will be cut in half.

Keep in mind one thing, however: The high-frequency characteristics of low-noise tape are different from standard formulations, and so require a different (higher) bias setting for flat high-frequency response. More and more tape recorders now come through from the manufacturers biased for low-noise tape, although it's a good idea to check for correct bias setting. If you wish to change tape formulations, we suggest that you have the bias checked as we discussed previously. You should then stick to the type of tape you've decided on.

Remember finally that if you change formulation, you should also redo the Record Calibration of your recorder and the Model 100A.

6. What speed should be used?

Since we don't know what recorder you'll be using with the Model 100A, we can't tell you what speed you'll find best suited to your purposes. We can warn you of one thing, however—in evaluating what happens at slow speeds with the Model 100A, don't let your prejudices against slower speeds influence your listening. Listen with an open mind.

If you have one of the better home recorders of fairly recent manufacture, which is properly adjusted, and which is capable at 3¾ ips of record response up to 13 or 14 kHz, as most are—then we would predict the following based on our own experience with such machines:

At 3¾ ips, the tapes that you make will probably be indistinguishable from the best tapes, records, or "live" FM broadcasts that you can find to copy. With this kind of performance, believe us when we say that there would be *no* advantage in using a faster speed except for live recording.

If you have such a recorder, very good microphones, and a desire to capture more of the dynamic range of live music than you ever dreamed possible with home equipment, then we suggest that you try using 7½ ips. In terms of frequency response, noise, distortion, and most importantly dynamic range, the tapes made "live" with the

Model 100A and such equipment can in every audible way surpass the results of the finest professional studio recorders operating at 15 ips.

As for 1⅞ ips, we suggest you not be afraid to try it. Chances are that it will at least provide the listenable kind of background music quality you used to associate with 3¾ ips. And on the best open reel machines and cassette decks, it is literally possible to make recordings using the Model 100A that rival 7½ ips performance.

We cannot, of course, be sure of the capabilities of your particular recorder, so be sure to experiment with an open, as well as objectively critical mind.

Specifications

The Advent Model 100A consists of two separate sections: a record section incorporating four line preamplifiers and a pair of record Dolby processors, and a playback section incorporating a pair of playback Dolby decoders and playback line preamplifiers.

General

Inputs:	Four individual (two on each channel) high level inputs, each with its own individual level control.
Mixing:	Two mixable inputs on each channel. All four inputs are controlled by a master Record Level control.
Outputs:	Two individually controlled preamp outputs (one for each channel). Front panel stereo headphone output. Two rear panel +18 Volts jacks for powering two accessory MPR-1 microphone preamps.
Monitoring:	Separate record and playback sections retain full source-tape monitoring when used with a recorder that incorporates this feature.
Metering:	Complete metering facilities, including a built-in calibration tone oscillator, are provided for precise level calibration of the Dolby System.

Overall Performance

Response:	20-20,000 Hz ± 1dB.
Distortion:	0.1% THD at Dolby Level at any frequency from 20-20,000 Hz. 0.1% IM distortion at Dolby Level.
Total Noise:	70 dB below Dolby Level
Noise Reduction:	10 dB @ 4,000 Hz and above 9 dB @ 2,400 Hz 6 dB @ 1,200 Hz 3 dB @ 600 Hz

Record Section

Input Sensitivity:	(Line 1 and 2) 60 mv for Dolby Level (OVU).
Input Impedance:	25,000 ohms minimum.
MX Filter:	19 kHz and 38 kHz notch filters to prevent false triggering of the Dolby System by FM multiplex subcarriers. With **MX FILTER** in, response is less than 1 dB down at 15 kHz, greater than 30 dB down at 19 kHz, and greater than 20 dB down at 38 kHz.
Output:	500 mv at Dolby Level, low Z.

Playback Section

Input Sensitivity:	100 mv for Dolby Level (OVU).
Input Impedance:	25,000 ohms minimum.
Bias Filter:	Low pass filter for eliminating bias and bias (supersonic) noise from output signal of tape recorder. Flat at 20 kHz. 3 dB down point is 28 kHz. with an 18 dB per octave roll-off thereafter.
Output:	With **OUTPUT LEVEL** controls at maximum, 1.0 volt from Dolby Level, low Z.

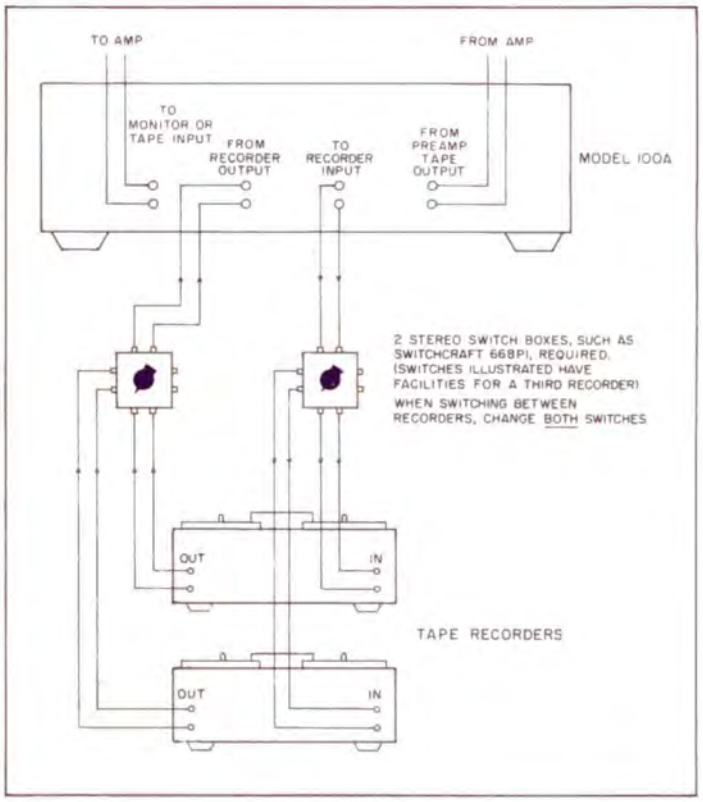
Mechanical Specifications

Front Panel:	12⅞" x 4⅞"
Chassis Size:	11¾" x 4⅛" x 7½" deep
Overall Height with Feet:	5"
Overall Depth with Knobs:	8¾"

Appendix

As described on page 15, the Model 100A's MODE switch provides for decoding Dolby-processed tapes played on other recorders connected to the amplifier (in addition to the recorder connected directly to the Model 100A), without changing connections.

However, if you wish to make *recordings* on more than one recorder, a change in connections is required. The following diagram and calibration instructions show how to connect one or two additional recorders to the 100A so that any one of them may be used regularly to make Dolby-processed recordings. The suggested external switch boxes can be used to select the appropriate recorder without the need for re-patching.



Calibrating Two Recorders with the 100A

A. If at least one of the recorders has output level controls, it is possible to calibrate both recorders in such a way that it will not be necessary to recalibrate each time you switch between recorders.

1. Start with the recorder which does *not* have output level controls, and do the Play and Record Calibration as instructed in the manual. (If both recorders have output level controls, start with either one.)

2. Switch to the second recorder (*with* output level controls) and do the Play Calibration as follows: play the Dolby Level Tape as instructed, but *adjust only the recorder's output level controls* so that the 100A's Dolby meters read to the line. *Do not adjust the 100's PLAY CAL controls*—leave them where they were after you calibrated the first recorder.

3. Do the Record Calibration for the second machine. You will now be able to switch between the two recorders without re-calibrating. However, remember as suggested in the manual to check Record Calibration if you change tape formulations.

B. If *neither* recorder has output level controls, it will probably be necessary to change the setting of the 100A's **PLAY CAL** controls when you switch recorders. Simply do the normal Play and Record calibration for each recorder individually, and mark the appropriate setting of the **PLAY CAL** controls for each recorder on the panel of the 100A. Thus you won't have to use the Dolby Level Tape every time you switch recorders.

C. Finally, it is possible to make two "Dolbyized" recordings simultaneously with the 100A. Simply connect readily-available "Y-cords" to the TO TAPE RECORDER INPUT jacks of the 100A, and connect the outputs of the Y-cords to the inputs of both recorders. This is the *only* circumstance when Y-cords should be used with the 100A. In particular, do not attempt to connect the *outputs* of two recorders through a Y-cord to the 100A.

Panel Mounting the Model 100A (see mounting template)

1. First make a rectangular cutout in the panel of the following dimensions: 4⅜" x 12".

2. Remove the rubber feet from the bottom of the unit.

3. If the unit is to be vertically mounted, simply drop it into the rectangular cutout. No supporting shelf is required since the front panel of the Model 100A will easily support its weight.

4. If the unit is to be mounted horizontally, either one of the two following techniques may be used:

a. A supporting shelf behind the panel. It is a good idea to drill two holes in the supporting shelf so that screws fed into the holes on the bottom of the Model 100A can be used to secure the unit to the shelf. This will prevent it from moving around.

b. Holes can be drilled into the four corners of the front panel of the Model 100A so that screws can be used to secure it to the panel surface. The mounting template indicates the drill centers for the screw holes. Number 8 screws should be used.

Accessories for the Model 100A

Two optional enclosures for the Model 100A are available from your Advent dealer:

The WC-1 is a wood cabinet with an oil walnut finish.

The CC-1 is a black leatherette carrying case. Both the front and back of the case are removable for access to the controls and connections.

In addition, the following items are available directly from the Advent Parts Department, 195 Albany Street, Cambridge, Mass. 02139.

Replacement Dolby Level Tape	$2.50
Replacement Dolby Level Cassette	$2.50
3 rolls of "Dolby System" Labels	$1.00
Model 100A Service Manual	$2.00

A check or money order should accompany your order. There is no charge for postage or handling.

Warranty

The Advent Model 100A is guaranteed for one year from date of purchase. During that period, Advent will repair any defect that occurs in normal use without charge for either parts or labor. The owner's responsibilities are to use the Model 100A according to its written instructions, and to provide transportation to our factory or to the Advent Dealer from whom the unit was purchased in the event that servicing is required.

This warranty is void if the serial number has been removed or defaced, or if repair has been attempted by any person or agency not authorized by Advent. In addition, the warranty does not cover malfunction due to abuse or misadjustment of non-user adjustments.

What To Do

If you suspect a defect in the 100A, return it to the dealer from whom it was purchased so that he can verify it for you and take whatever action might be required.

If it is not possible to return it to your dealer, please write to the Advent factory, Attention Service Department, and give us the serial number of your unit, a specific description of the defect, and whether you have retained the original cartons and fillers or need new ones, so that we can advise you of what action to take. If it is necessary to return the 100A to the factory, please ship it freight prepaid, using the "Authorized Return" label we will provide you in our response. After the 100A has been repaired, it will be returned freight prepaid.

The Warranty Card

The enclosed postpaid warranty registration card should be filled out and returned to the factory within 15 days of date of purchase. Doing so will enable us to keep you informed of any information relevant to your unit, such as any new applications of the Dolby System. Rest assured that Advent will not sell your name to any mailing lists.

Owner's Record

For your convenience and protection, we suggest that you fill in the information indicated below, so that you have an easily accessible record of the purchase of your Model 100A.

Serial Number_____

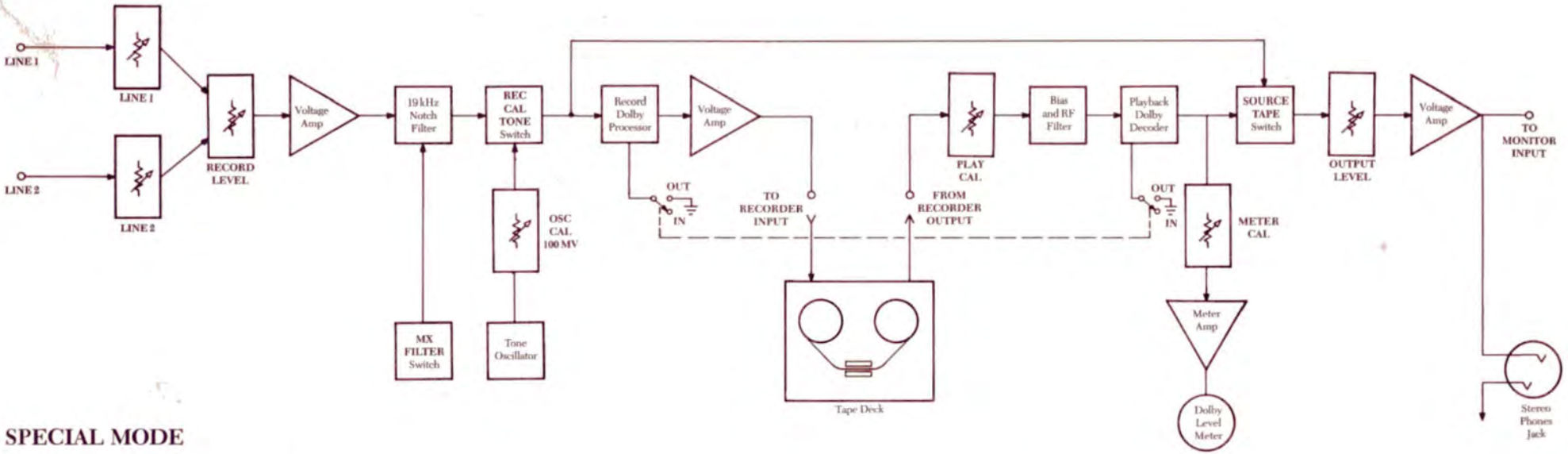
Date Purchased_____

Dealer_____

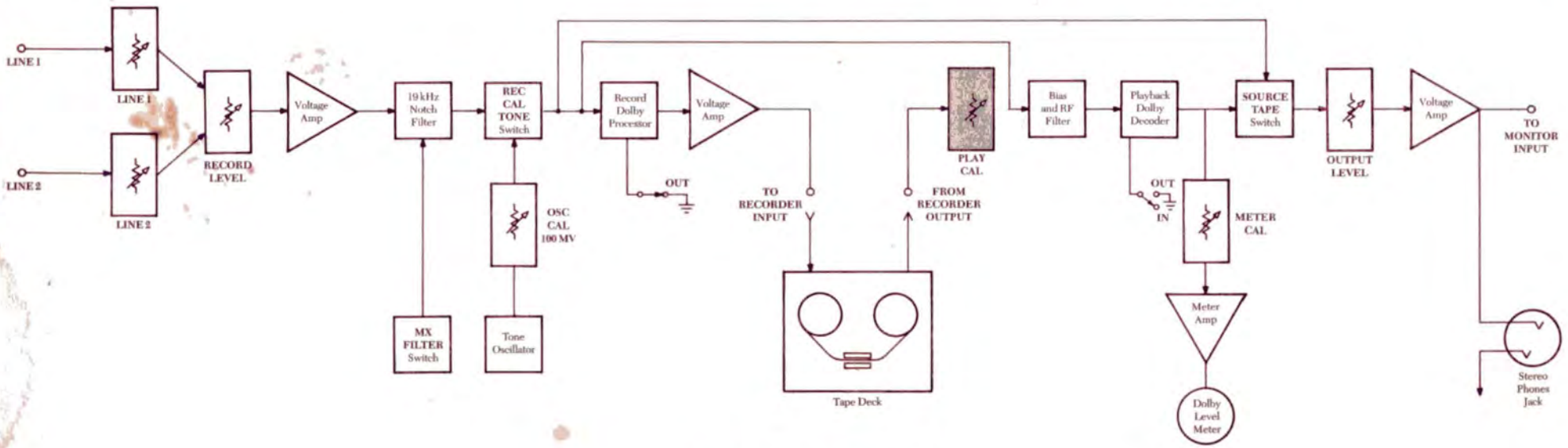
Dealer's Sales Slip Number_____

BLOCK DIAGRAMS OF THE MODEL 100A

NORMAL MODE



SPECIAL MODE



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