Recording Techniques

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RECORDING LIVE TO 2-TRACK

•To achieve a commercial recorded sound, most bands require a multi-track recording, overdubs, and mix-down. But some musical groups can be recorded on a 2-track recorder in real time as the music is performed. You can record them using either multiple microphones and a mixer, or a stereo pair of microphones. The latter method works well with many groups: quartets, soloists, folk groups, orchestras, pipe organs, or symphonic bands.

PROS AND CONS

The advantages of recording live to 2-track are:

•You record only one generation. By omitting the multi-track recording, you eliminate its noise and distortion. The result is a cleaner recording.

•Recording is faster. When a satisfactory take is done, the recording is done, too. No overdubs or mixdown are needed.

•The musical performance can be more exciting. The musicians know that mistakes can't be fixed in the mix, so they play better. Also, they play as an ensemble—because there are no overdubs—and react emotionally to each other's presence.

•If you use a single stereo microphone pair, the recording can be more realistic and natural. There's no artificial reverberation and no close mic'ing to color the timbre.

The disadvantages are:

•You must make all the decisions about mic placement, balance, etc. at the session—a high-pressure situation.

•If one musician makes a mistake, you must record the entire ensemble again. You can't overdub just the flawed part.

•If the recording engineer makes a mistake in setting the balance among instruments, the recording must be done again. (If the mistake occurs near the end of the song, you might be able to start another take just before the error, and edit the two takes together.)

•If you record with a single stereo pair, you must control the ambience and balance by adjusting the room acoustics and the players' positions. This is more difficult than turning the appropriate knobs on the mixing console.

In this article we'll explore two types of live-to-2-track recording:

1. Recording true stereo with two mics into a 2-track tape deck.

2. Recording with multiple mics and a mixer into a 2-track tape deck.

EQUIPMENT

Good "true stereo" recordings can be made with simple equipment. You need:

•A quality stereo cassette deck or open-reel deck.

•Some higher-cost alternatives to the above are an R-DAT deck, a Beta Hi-Fi or VHS Hi-Fi VCR, or a digital audio adapter with a VCR. All these provide superior sound quality.

•Blank tape—Use the tape recommended by the recorder manufacturer. For open reel, use high-output low-noise tape. For cassettes, use high-bias (chrome or metal) tape, C-60 length or shorter.

•A stereo microphone costing at least $50.00, or two separate high-quality microphones.

•One or two microphone stands and booms, plus a stereo mic stand adapter (for two mics).

•High-quality headphones for monitoring.

THE TAPE DECK

Let's consider the requirements for a quality tape deck. Obtain the published specifications for the deck you want to buy or use, and look for the following:

•Noise Reduction. The Dolby and dbx systems are commonly used in cassette decks. Noise reduction is essential with cassette recorders because the slow tape speed and narrow track width result in audible tape noise.

Dolby C is more effective than Dolby B, and dbx is more effective than either. Still, Dolby is free of the "breathing" sound (modulation noise) that is sometimes heard on dbx'd tracks. Chances are you'll be equally satisfied with Dolby C or dbx.

•Wow & Flutter. Wow is a slow periodic variation in tape speed; flutter is a rapid variation. If excessive, they wobble the pitch of recorded instruments. The lower the wow & flutter spec, the steadier is the reproduced pitch.

Regarding the wow & flutter specification:

0.03 percent RMS weighted (or WRMS) is excellent.

0.04 percent RMS weighted (or WRMS) is very good.

0.1 percent IEC/ANSI peak weighted is very good.

Higher values than the above are not as good, and mean that you may hear the pitch wobble on recorded stringed instruments.

•Signal-to-noise Ratio. This is the ratio, expressed in dB, between the maximum undistorted recorded signal level and the noise level. The higher the figure, the more noise-free is the recording. All the following specs are measured with noise reduction:

90 dB is excellent (typical of dbx).

70 dB is very good (typical of Dolby C).

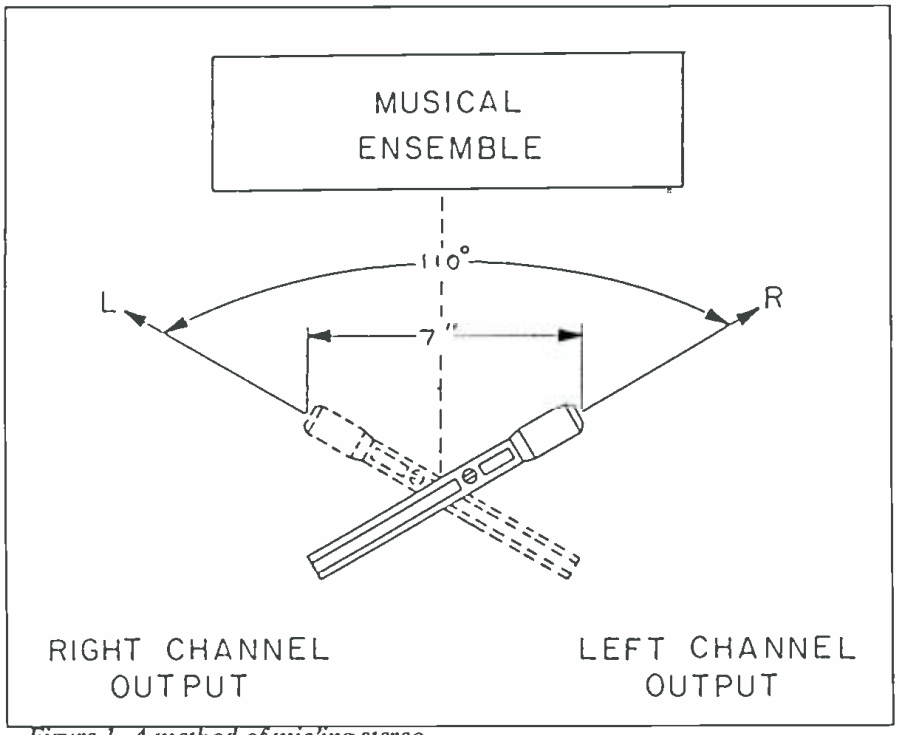


Figure 1. A method of mic'ing stereo.

65 dB is good.

55 dB is fair.

These specs are A-weighted, which means that the measurement was done in a way to correlate with the annoyance value of the noise. When comparing two different decks, be sure that both signal-to-noise specs are A-weighted.

•Record/Play Response. This is the range of frequencies that the recorder will record and play back at an equal level, within a tolerance (such as ± 3 dB). The lower the lower frequency, and the higher the upper frequency, the better the fidelity.

40Hz-12.5kHz ±3dB is fair.

40Hz-14kHz ±3dB is good.

40Hz-18kHz ±3dB is excellent.

MICROPHONES

Now let's consider microphones. If you're recording a singer/guitarist, a classical-music soloist, or a small acoustic group such as a vocal quartet or folk group, get a stereo microphone costing at least $50.00. An alternative is two identical microphones. If these microphones are the cardioid type (preferred), mount them on a stereo bar—a device that holds two mics on a single stand for stereo mic'ing. Angle them apart about 110 degrees (55 degrees either side of center) and space their grilles 7 inches apart horizontally, as in *Figure 1*.

If the two identical microphones are the omnidirectional type, place each one on a mic stand and space them 3 feet apart for a small group or 10 feet apart for a large symphonic ensemble.

For a singer who accompanies oneself on piano, get an omnidirectional microphone for the voice. Unlike a directional microphone, an omnidirectional unit does not get bassy when you place it close to the mouth. Chances are that an electret condenser type will sound best. Some models require a battery to operate, which lasts up to a year. If you already have another type of microphone, it's okay to use, but an omnidirectional condenser mic is recommended.

For grand piano, you might want to use a miniature condenser microphone.

For the piano, get one of the following microphones:

•A miniature omnidirectional condenser microphone

•A cardioid electret-condenser microphone

•A boundary microphone.

Or just use whatever you have if it sounds good to you.

PRE-RECORDING SETUP

Clean the recorder heads before each recording with a cotton swab moistened with isopropyl or denatured alcohol (from a drugstore). Do not use rubbing alcohol. Rub the swab on the head surfaces that contact the tape. Clean the rubber roller, too.

If you're using a cassette recorder, set the tape-type switch to the type of tape that you're using (it's specified on the cassette). This should be "high bias," "CrO^2 (chrome)," or "metal." Switch on the noise reduction, both during recording and playback.

If you plan to send your tape to someone else, find out whether their cassette machine has noise reduction, and what type it is. Set your machine to match. If you don't know what type they have, use Dolby B because it is the most common. Write on the cassette label what kind of noise reduction you used (dbx, Dolby B, or Dolby C).

CHOICE OF RECORDING ROOM

A folk or bluegrass group is best recorded in an acoustically "dead" room that is free of echoes. Such a room probably has carpeting, acoustic-tile ceiling, stuffed furniture, and drapes. If you need to deaden the room acoustics, hang some absorbers such as heavy blankets, sleeping bags, or comforters spaced out from the walls.

A classical-music soloist or ensemble sounds best when recorded in a "live" room that has noticeable reverberation, such as a church or recital hall. The room acoustics enhance the recording for this type of music.

MICROPHONE TECHNIQUES

Screw the microphone stand adapter onto a microphone stand. Place the microphone in its stand adapter.

When mic'ing a soloist or ensemble in stereo, put a stereo microphone (or a pair of identical microphones) close to the musicians, about two-to-five feet away, as in *Figure 2*. Place the mic about one-to-two feet away to pick up a singer playing an acoustic guitar. For a grand piano solo, raise the lid on the long stick.

To record a singer who accompanies oneself on piano, you'll need two separate microphones—one for the voice, one for the piano. You'll also need one or two booms. A boom is an adjustable pipe that mounts on a mic stand for positioning the mic. Put a foam pop filter or windscreen on the vocal micro-

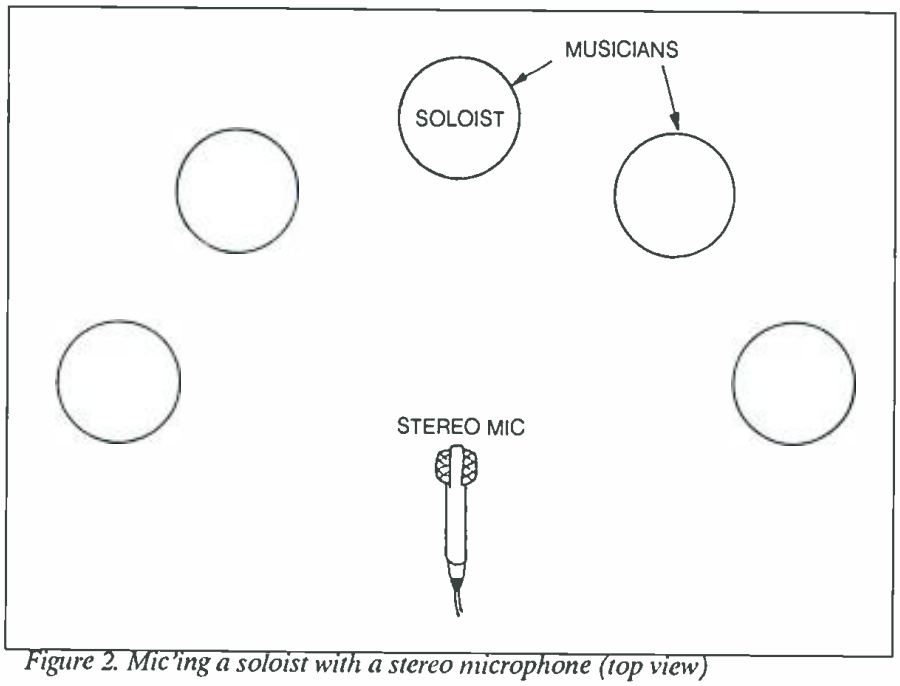


Figure 2. Mic'ing a soloist with a stereo microphone (top view)

phone to reduce breath pops. Place the mic about 1 to 3 inches from the mouth (as shown in *Figure 3*).

For grand piano, you might want to use a miniature condenser microphone. Tape it to the raised lid in the middle, as suggested by the manufacturer. Another useful microphone is a surface-mounted boundary microphone, a flat-plate unit. Alternatively, remove the lid and aim a cardioid electret-condenser mic down over the middle strings, at least 1 foot up, and about 1 foot horizontally from the hammers.

This method produces exaggerated stereo. You may prefer to mic the piano in stereo, and use a mixer to pan the vocal midway between your stereo speakers.

Tips for recording large acoustic ensembles have appeared in earlier issues of **db**.

RECORDING

With the microphones carefully placed, you're ready to begin recording. First, plug the mic cables into the left and right mic inputs of your cassette deck. Press the record and pause buttons. Set the recording level to peak around 0 on the loudest part of the song.

Now you're ready to record and make adjustments. Press the pause button again to release it so that the deck starts recording. Don't make any noise before or after performing the song. After the performance is done, rewind the cassette and listen to it.

Suppose you've recorded a singing pianist. If the voice is too loud relative to the piano, turn down the volume control slightly for the vocal microphone and try again. Do the same for the piano-mic volume if the piano is drowning out the vocal.

Suppose you've recorded a small acoustic ensemble. If the sound is too distant or muddy, place the microphone(s) closer to the ensemble and try again. Or add more acoustic absorbers to the room. If any musician is too quiet relative to the others, have him or her move closer to the microphone and try again. If the balance still is poor or the recording has too much room acoustics, try mic'ing voices and instruments up close, and blending them with your mixer. This technique is described later.

If you want to make copies of your master tape, you can either copy from one deck to another, or use a dubbing cassette deck that holds two cassettes.

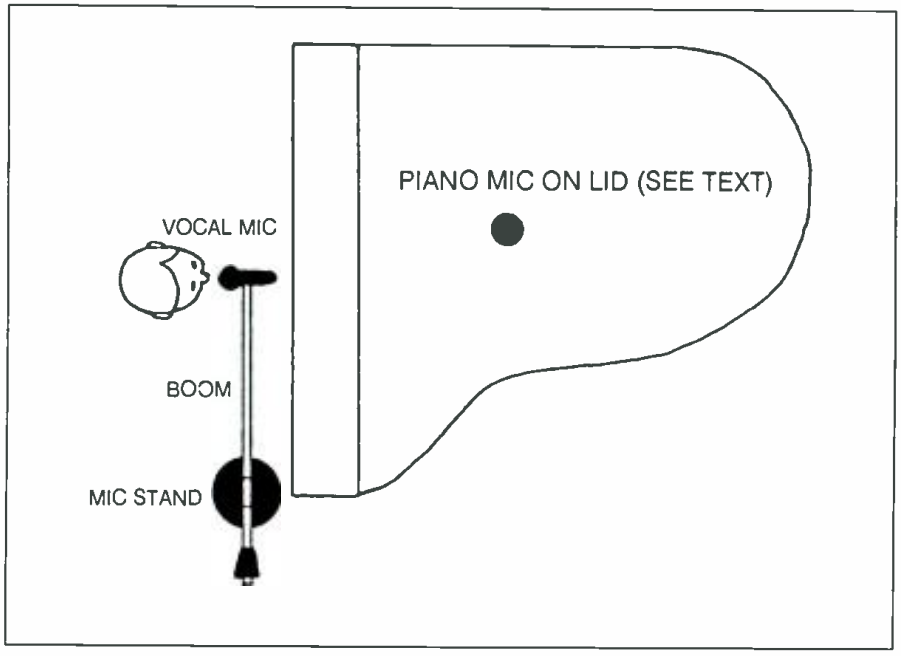
Now suppose you've used a stereo microphone to record a singer who plays guitar. Move the mic closer if the sound is too distant, and *vice versa*. Raise the mic on its stand if the voice is too quiet; lower it if the guitar is too quiet.

When you're satisfied with the balance and microphone distance, record other tunes. Leave about 2 to 4 seconds of silence between songs. There's your finished master tape!

RECORDING WITH MULTIPLE MICS AND A MIXER

To record live to 2-track in this manner, you must take extra care to achieve good isolation between microphones. To do this, try to record in a large room, use direct boxes, and mic close with directional microphones.

Figure 3. One way to mic a singer and piano (top view).



Set up your mixer as if you were going to do a mixdown, except with the input selector switches set to "MIC." Plug in your microphones, synth cables and direct boxes. Patch in effects and the 2-track deck. Set the master and sub-master faders to design center (about 3/4 up), and do the mix with the input faders. Adjust equalization, panning, and effects. Set recording levels: both the mixer and recorder meters should peak around +3 VU maximum for open-reel recorders, or 0 VU for cassette recorders. When all is ready, hit the record button.

You may need to adjust the mix during the performance. Do a few run-throughs and note on the faders the positions for each change.

TAPE COPIES

If you want to make copies of your master tape, you can either copy from one deck to another, or use a dubbing cassette deck that holds two cassettes.

To copy from one deck to another, simply connect a cable between the play-deck output connectors and the record-deck input connectors. This cable should have RCA phono plugs on each end to match your equipment. Set the recording level carefully to peak around 0 VU maximum on the loudest parts (+3 VU for open-reel decks).

To copy a tape with a dubbing deck, insert your master tape into the "play" section and insert a blank chrome or metal tape into the "record" section. The dubbing deck might work at two speeds; the slower speed usually provides better fidelity. If necessary, set the recording level and press the record button to copy the tape.

Whether using a dubbing deck or two decks for your copy, be sure to set the tape-type switches and noise-reduction switches appropriately. Ideally, the copy will sound nearly as good as the master tape.

CONCLUSION

While multi-track recording is the norm these days, excellent tapes can be made live to 2-track. Although this method is easier and costs less, it has limitations. Once these are overcome, the recording can sound cleaner and more realistic than a multi-track mixdown, and the musical performance can be very exciting . db