

PRACTICAL GUIDE TO THE EDIROL R-44



**Amazing 24 bit/192 kHz ultra-high sound quality!!
Easy to transport!! Lightweight 4-channel recorder!!
4-channel simultaneous recording techniques are
thoroughly explained!!**

R-44 Features

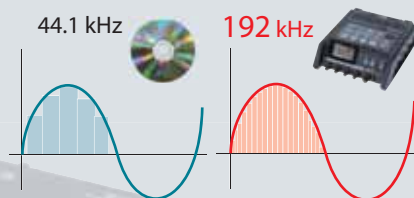
Compact 4-channel Recorder

The functions needed for 4-channel recording have been condensed into a unit the size of a palm. With just one R-44, you can perform complete 4-channel recording. It weighs a mere 1.3 kg, even with four AA batteries and an SD card.



Obsession with Quality

You can record at 24 bit/192 kHz, far better than the 16 bit/44.1 kHz for CDs.



**Sampling frequency
more than 4x higher than a CD**

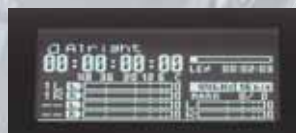
SD Card for Longer Recording Times

The R-44 uses a SD card (also supports SDHC cards) for its recording media. Over two hours of a CD-quality recording can be saved on a 2GB SD card. And you can record for four hours with four alkaline batteries or four nickel-metal-hydride (NiMH) batteries. It can even be used outdoors.



Highly Visible, Easy-to-see Screen

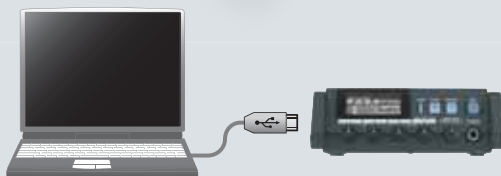
The organic EL display ensures high contrast, wide viewing angle, and fast screen response. You can see all the data easily, even in the outdoors or in concert halls. The level meter responds quickly for stress-free level adjusting.



Linking to a PC

With USB 2.0 (high speed) support, you can transfer sound data to a PC with a single USB cable. The data can then be played on software that comes standard with the PC.

* Some PC environments may not play 24-bit recordings.



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Recording Acoustic Instruments

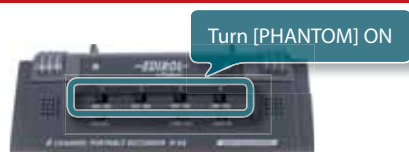
Using the R-44 allows you to realistically record a variety of instrumental performances. We introduce several recording tips here.

1

Preparing to Record

- Connect two microphones (DR-80C) to the R-44.
- It's convenient to use a microphone stand.
- Turn [PHANTOM] ON.

 For details, refer to the owner's manual.



Record Settings

We recommend the following settings for making a CD.

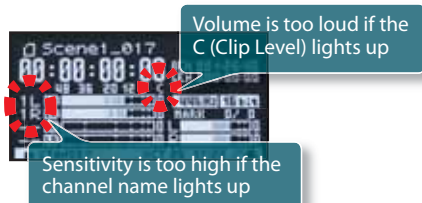
Input Select	Analog	Sets the mode to record with external microphones
Rec Freq.	44.1 kHz	We recommend 44.1 kHz if you want to make a CD
Rec Bit	16 bit	You can use 88.2 kHz for higher quality and perform accurate dithering to CD later
Rec Mode	STEREO × 1	Setting to use one stereo system (2 channels) to record
Pre Recording	OFF	No need to set this
Project Name	Date	If you set the date, it is easy to know the recording date and time

 For details on how to make recording settings, refer to the owner's manual.


2

Matching the Recording Levels

The first step in recording is to determine the input level by matching it to the loudest sound to record. Play the phrase that is the loudest so the R-44 level meter goes as high as possible, and then adjust the [SENS]/[LEVEL] input level knobs so that the R-44 level meter falls just short of the C (clip level) on the right when the maximum volume is reached.



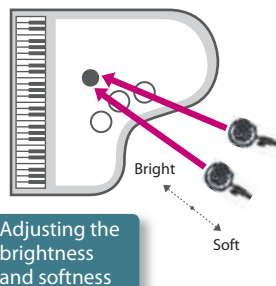
When the input level is too low, the dynamic feel of the sound is lost; when it is too high, the sound becomes distorted (pops and clicks and other noise occurs).

 For details on setting the input level, refer to the owner's manual.

3

Aiming the Microphones

The microphone records sounds for the right ear and left ear separately. So, it is important to directly face the person or instrument you are recording. Also, as you move closer to the sound source, you get a crisper sound; as you move away, you get a softer sound because you also record the room echoes.



 See "Instrument Recording Techniques" on p. 6 of this guide for how to record different instruments.

4-channel Recording

Since you can record on 4 channels simultaneously, you can try setting microphones in different locations around the instrument.

For example, you can record near the instrument (on-mic) and far from the instrument to record echoes (off-mic) at the same time. You can then adjust the volume for each to create a mixed sound.

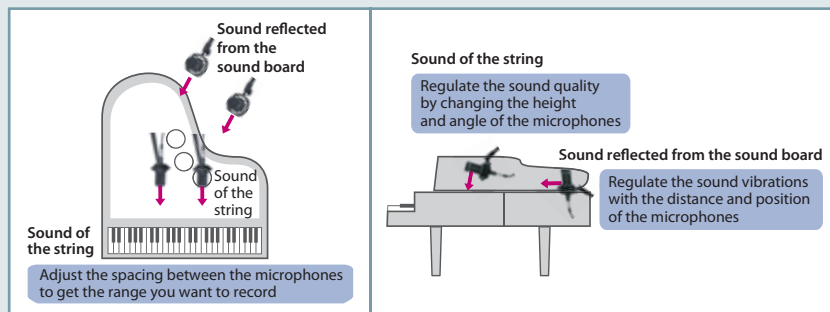
Recording a Grand Piano

Unlike smaller instruments, the piano produces sound throughout the instrument and emits sound in different directions. So, it can be difficult to record a piano. But, you can use the 4-channel simultaneous recording feature to record sound from different directions and distances. Then, you can mix-down to create a piano recording that matches the genre of the performed song. Also, it is important to balance the “sound of the string,” “sound from the body,” “sound reflected from the sound board,” and “sound of the hammer hitting the strings” when recording a piano. In other words, the trick to recording a piano is to set microphones in different locations to compare different sounds.

An example of setting the microphones is shown here.

As shown in the illustration, set a total of four microphones (use condenser microphones): two to record the string sound and two to record the sound reflected from the sound board. In particular, test changing the position and angle of the microphones recording the string sounds to adjust the range of the recording and the balance of the sound from the strings and sound board and also try changing the distance to adjust the balance between the sound of attack and reverberations to get the cleanest recording.

R-44 Setting : Rec. Mode in STEREO X 2

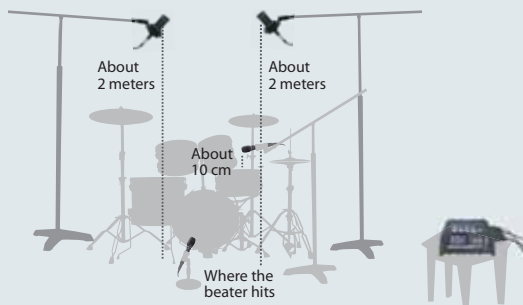


Recording Drums

The drum is an instrument that plays sound in several different directions. We recommend using simultaneous recording with four channels.


Start by placing two microphones above the drum (condenser microphones) and one microphone each on the bass drum and snare (dynamic microphones), for a total of four recording locations. You should use microphone stands above the drum and place the microphones at a height of about 2 meters. At this height, the sound from the entire drum set can be recorded. For the bass drum, place the microphone in front aimed at the place where the beater hits. For the snare, you should place the microphone about 10 cm above the snare so you can clearly record only the sound of the snare. You'll be able to easily emphasize just the bass drum sound by adjusting the volume of each channel if you use this setup.

R-44 Setting : Rec. Mode in STEREO X 4

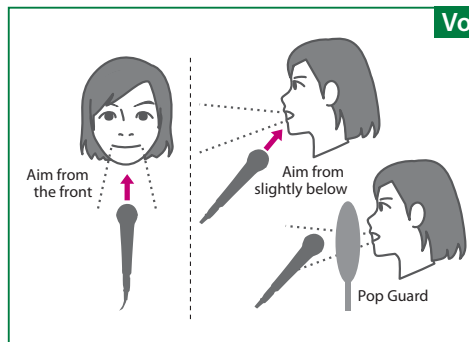


Instrument Recording Techniques

This section describes where to place microphones for various instruments.

 For more about dynamic microphones and condenser microphones, refer to “Microphone Type” on p. 19 of this guide.

Vocals



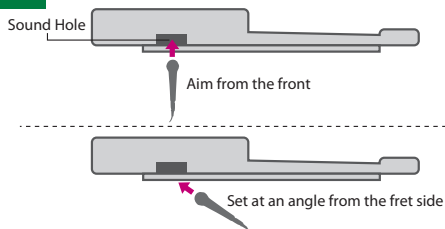
Ideally, you should choose a place, such as a studio, where noise isn't introduced from the surroundings. If recording in a room, try to choose a room that doesn't have environmental noise (automobile noise or city noises) and that has the sound reflection that you want.

Although the basic position for the microphone is directly in front, it is OK to aim it from slightly above or slightly below. This is because sound comes not only from the mouth but also from the head. Although you can use a dynamic microphone, we recommend using a condenser microphone to get a cleaner recording. If some breathing noise is recorded, try using a window screen or pop guard. You can also try changing the direction or angle of the microphone.

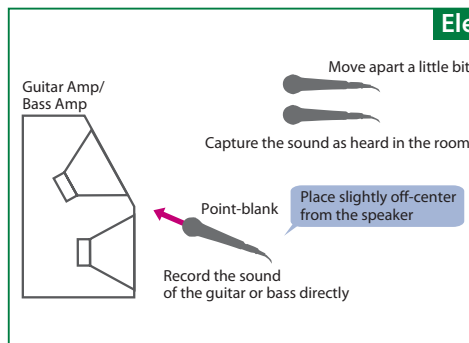
Acoustic Guitar

First, the microphone is basically aimed directly at the front of the sound hole. However, you can also adjust the distance and angle to the sound hole to find a sound that you like. When placing the microphone at an angle, we recommended doing so from the fret side. This gives you a cleaner recording.

Although you can use a dynamic microphone, we recommend using a condenser microphone to get a cleaner recording.



Electric Guitar or Bass



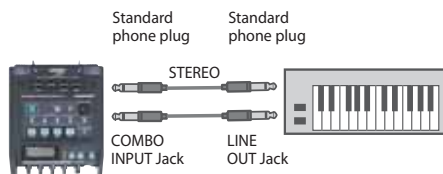
When playing through a guitar amp or bass amp at a studio, it is important to use the actual volume and settings used for performances. Place the microphone a little off-center from the speakers and aim it from point-blank range. Be sure to use a dynamic microphone that can withstand vibrations. If you want the recording to give the feel of playing in a room, use two microphones at distances to record in stereo. However, be careful because if you set the microphones too far, there is too much reflected sound and the sound contours become blurred.

If you are recording in a room, you can also use line recording by connecting an effector with an amp modeling feature or an amp to the R-44 by cable. This is because units that have amp modeling are designed to produce realistic sound even with a line connection.

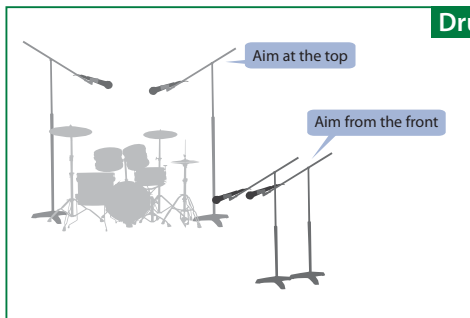
Synthesizer or Organ

You can record electronic instruments like synthesizers, organs, samplers, or rhythm machines by connecting the instrument's line output jack directly to the R-44 combo input jack. Some digital synthesizers have effector or mastering features, so the line recordings can faithfully reproduce the created sounds.

You can record instruments played through an amplifier by considering the distance to the amp, just as with the electric guitar.



Drums



You should use a stereo microphone or two microphones aimed from above the drums to record the sound of the entire kit. It is generally recommended to record from a height of 2 meters, but you can use a microphone stand and adjust the height and angle to find the sound you want. You can also aim from a spot a little from the front. You should be careful when using a unidirectional microphone, because if it is pointed at a particular drum, only the sound of that drum will be featured. In this case, adjust the angle of the microphone.

You can use 4-channel recording to capture even better sound.
See "4-channel Recording" on p. 5 for details.

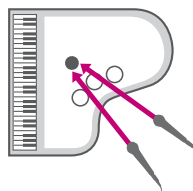
Piano

Unlike recording smaller instruments, when you record sound from a piano you want to record the sound from the entire instrument. You can get an overall balanced recording by setting two microphones a small distance from the S-shaped depression.

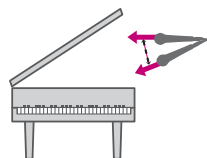
Also, you can adjust the balance between the strings and the sound board with the angles of the microphones and adjust the balance between the sound of attack and reverberations to get the cleanest recording by moving the microphones closer in or farther out.

You can use 4-channel recording to capture even better sound.

See "4-channel Recording" on p. 5 for details.



Adjusting the balance between the sound of attack and reverberations



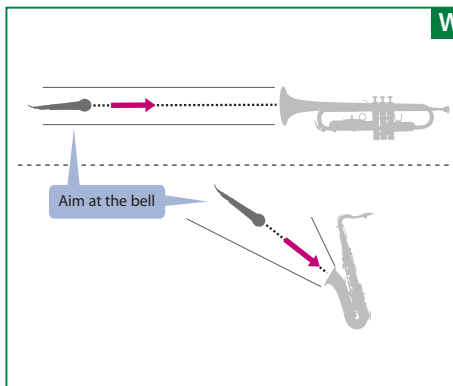
Adjusting the balance between the strings and the sound board

Wind Instruments

Basically, you should place the microphone in front of the bell of the wind instrument. When aiming at the bell, you should use a wind screen because "blowing noise" is generated from the wind instrument. Although you can use a dynamic microphone, we recommend using a condenser microphone to get a cleaner recording.

When recording a solo performance, woodwinds like the saxophone have some sound coming from the keys as well as from the bell, and when all the keys are pressed, the volume from the bell changes radically. In this situation, you should probably aim somewhere between the bell and the keys. You can record a smooth performance this way.

When recording a horn section, you should set a microphone for each horn, and record with an on-mike. If you do this, there will be no overlap of sound which gives you a cleaner recording. The R-44 can simultaneously record 4 channels, so we recommend setting a microphone for each horn.



String Instruments

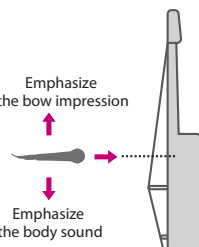
String instruments, like the violin or double bass, are in some ways like an acoustic guitar, so you should record them by balancing the sound of the string vibrations and the sound from the body. You should aim the microphone at the bridge or resonance aperture of the instrument from about 1 to 1.5 meters above. You can then get a clean recording. Although you can use a dynamic microphone, we recommend using a condenser microphone to get a cleaner recording.

Aim from 1 to 1.5 meters above



Emphasize the bow impression

Emphasize the body sound



Recording Band Performances

You can easily record band rehearsals using the R-44 internal microphones. Here, we describe several recording tips for using the internal microphones.

1 Preparing to Record

- An external microphone is unnecessary because you are using the internal microphones.

Record Settings

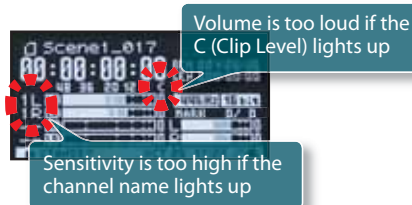
We recommend the following settings for making a CD when recording with the internal microphones.

Input Select	IntMic	Sets the mode to record with the internal microphones
Rec Freq.	44.1 kHz	We recommend 44.1 kHz if you want to make a CD
Rec Bit	16 bit	
Rec Mode	STEREO × 1	Setting to use one stereo system (2 channels) to record
Pre Recording	OFF	No need to set this
Project Name	Date	If you set the date, it is easy to know the recording date and time


 For details on how to make recording settings, refer to the owner's manual.

2 Matching the Recording Levels

Before recording the band performance, consider the song structure and find the place in the song where the volume is the loudest. Adjust so that the R-44 level meter goes as high as possible but falls just short of the C (clip level) at maximum volume.

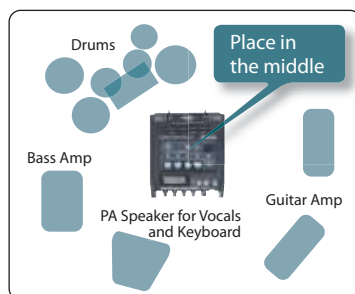


If the recording level is too low, the entire recording is done at the low volume. If it is too high, the recording can be distorted (popping noise or if even higher, the sound can be severely distorted).

 For details on setting the input level, refer to the owner's manual.

3 Positioning the R-44

When rehearsing in a rehearsal studio, the instruments are often located throughout the room. You should position the R-44 in the middle of the studio to record the sound of each instrument equally. You should also place the microphone at about table-height. If the microphone is placed on the floor, the sound is muffled and unclear; if it is placed too high, you lose the bass range and the sound becomes tinny.



4-channel Recording

Record the band performance in one shot with four channels

Because you can record four channels simultaneously, you can record all four parts (vocals, guitar, bass, and drums), each on a separate channel, at the same time. You can also connect microphones or instruments directly into the four combo input jacks without using a mixer.

After recording, you'll be able to adjust the volume of each part, allowing you to check the performance of individual parts. This is convenient, since it allows you to check your own part as well as listen to the entire band's practice session.

R-44 Setting : Rec. Mode in MONO X 4
: Input Select to Analog

Matching the recording levels

You can have a more perfect recording by setting recording levels for each part. You can achieve good balance by first adjusting the microphone for the drums, then the bass, guitar, and vocals, in that order. Also, if you turn on the [LIMITER], described above, you can prevent clipped sounds when there are very loud sounds.

Connections and Settings

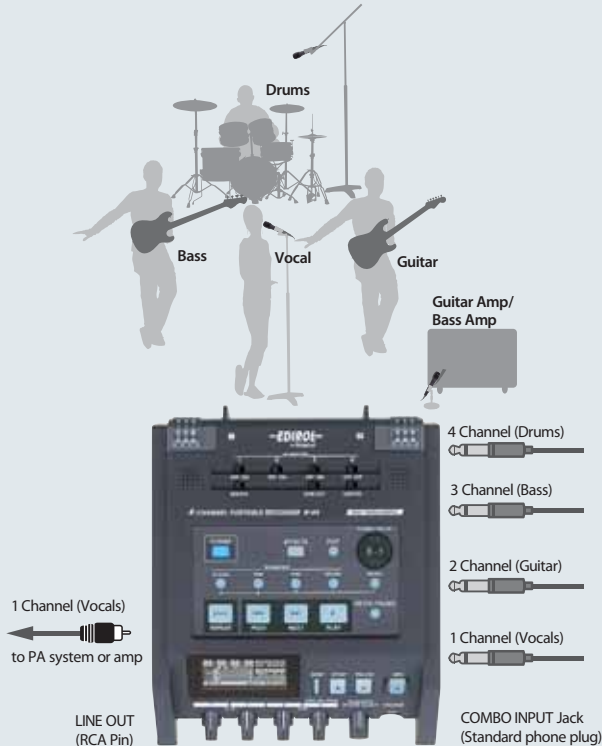
You should connect microphones and instruments to the R-44 as shown in the illustration.

See "Instrument Recording Techniques" on p. 6 of this guide for microphone settings.

Vocals must be output from PA equipment or an amp, so set the R-44 LINE OUT setting (Output Sel) to 4-indiv, and set output to the same channel as the input channel.

Also, you should use a microphone to record the sound from the guitar amp so that the characteristics of the amp sound can also be recorded.

 For details on Output Sel settings, refer to the owner's manual.



Recording Concerts

The R-44 keeps the realistic, live sound of concerts and performances. Here, we describe several tips on how to make more realistic recordings.

1 Preparing to Record

- Connect two microphones (DR-80C) to the R-44.
- It's convenient to use microphone stands.
- Turn [PHANTOM] ON.

 For details on phantom power, refer to the owner's manual.



Record Settings

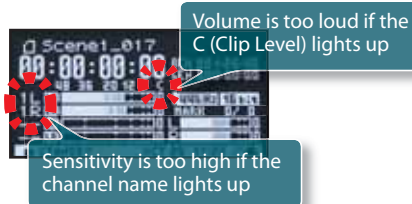
We recommend the following settings for making a CD. Also, you should do the Pre Recording settings to prevent missing a recording.

Input Select	Analog	Sets the mode to record with an external microphone
Rec Freq.	44.1 kHz	We recommend 44.1 kHz if you want to make a CD
Rec Bit	16 bit	We recommend 48 kHz if you want to synch to video to create a DVD
Rec Mode	STEREO × 1	Setting to use one stereo system (2 channels) to record
Pre Recording	15 sec	Set to 10–15 seconds to prevent missing recording something
Project Name	Date	If you set the date, it is easy to know the recording date and time


 For details on how to make recording settings, refer to the owner's manual.

2 Matching the Recording Levels

You should find out the maximum volume during rehearsals before the performance begins. It is difficult to adjust the volume level after the performance begins. You should match the recording level before the actual performance.

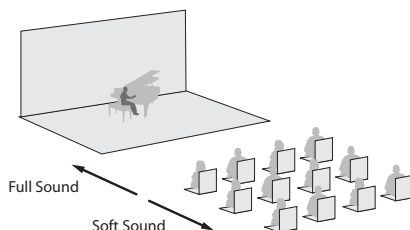


You also need to do a trial recording during rehearsal to check the sound quality in the arena or concert hall in advance.

 For details on setting the input level, refer to the owner's manual.

3 Microphones Location

The sound is fuller the closer to the stage the microphones are placed, and the sound is softer the further the microphones are because there are more reverberations. You must check the microphone placement during rehearsal because the placement is very important.



 For details see "Setting and Placing Microphones in Arenas or Concert Halls" on p. 12 in this guide.

4-channel Recording

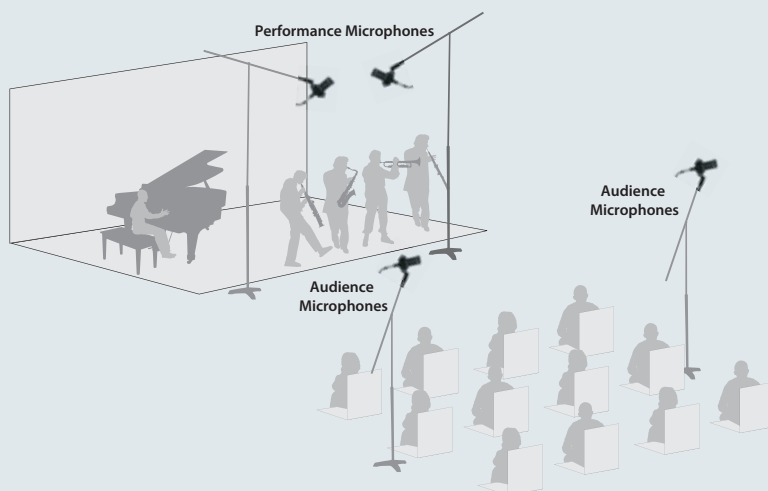
Here, we describe how to perform basic recordings using four channels. These examples use four DR-80C microphones. For details on microphone settings see "Setting and Placing Microphones in Arenas or Concert Halls" on p. 12 in this guide.

Recording the "Performance" and "Audience" Simultaneously

This describes how to make recordings with even more realism by using the 4-channel simultaneous recording feature. If you record the "performance" and the "audience" separately in stereo, you can record the actual experience of being at the arena. Also, you can easily make adjustments after the recording because the balance of each sound can be changed separately.

 See "Recording the Audience" on p. 13 in this guide for how to record the audience.

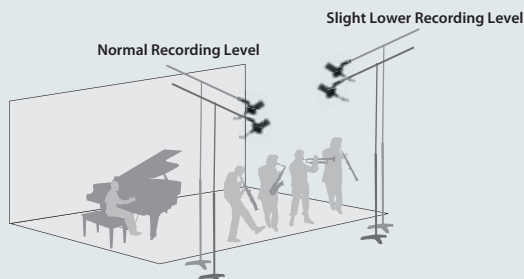
R-44 Setting : Rec.Mode in STEREO X 2



Recording Multiple Input Levels Simultaneously

Mistakes cannot be fixed at events like live performances. But even if you set the input level during rehearsal in advance, the recording can still fail because of unexpected sounds that are too loud or too soft. For these times, set combo input jacks 1 and 2 to the normal input level and combo input jacks 3 and 4 to a slightly lower input level. If you do this, you can avoid a recording mistake because even if the normal input level is clipped, the sound in combo input jacks 3 and 4 is not clipped.

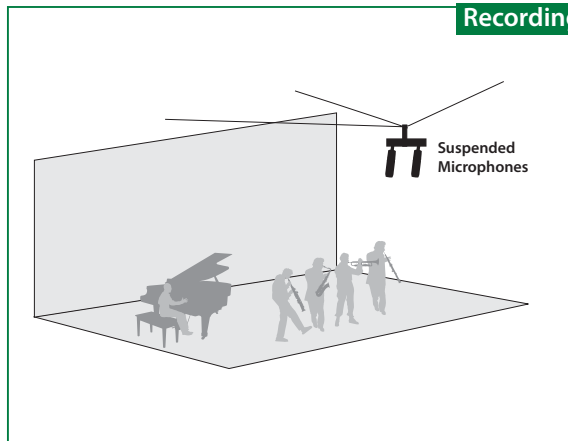
R-44 Setting : Rec.Mode in STEREO X 2



Setting and Placing Microphones in Arenas or Concert Halls

Because sound can change just by changing the microphone positions, microphone placement in arenas and concert halls is extremely important. The best placement can be hard to find because the sound echoes differently for each arena or concert hall. We introduce examples of setting microphones using general suspended microphones and using microphone stands.

Using Suspended Microphones



Recording with Suspended Microphones

Suspended microphones are microphones suspended from the ceiling and are set for recording public performances at authentic concert halls. These microphones allow the performance to be taped without bothering the guests or filming. You have to consult in advance with the performers about the height to suspend the microphones because if the microphones are too close they might interfere with the audience or filming. The best recording is usually made by having the microphones closer to the performers.

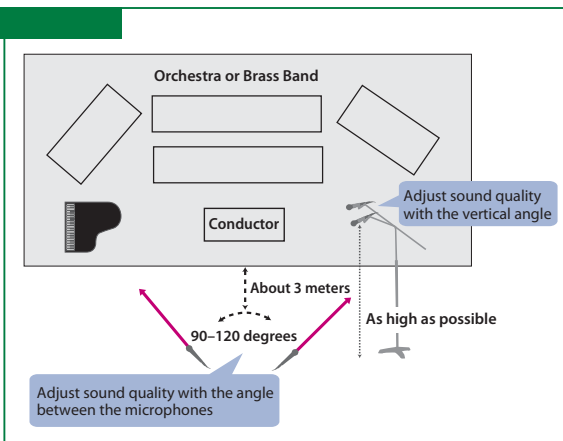
Caution! Be sure to check beforehand whether you can use facility equipment, such as the suspended microphones. You also need to check how to use the equipment and the type and characteristics of the microphones.

Using Microphone Stands

Microphone stands give you more freedom to adjust the microphone position than when using suspended microphones. But you have to consult in advance with the performers about the microphone stands because they might

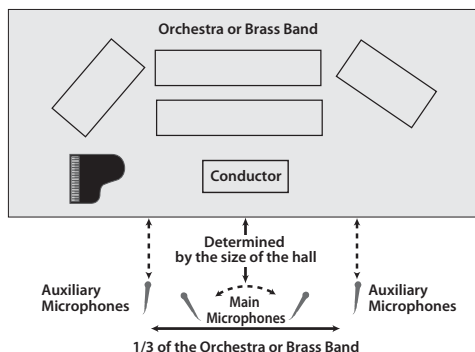
Recording in a Small Hall

Position two microphones near the center of stage about three meters in front of the stage (or behind the conductor) using the highest setting of the microphone stands. Set the left and right microphones apart at an angle from 90 to 120 degrees. Be careful because the angle between the microphones changes according to the size of the stage. If the angle is too large, the instruments in the center become faint; if the angle is too small, stereo sound is lost. Adjust the vertical angle so that the microphones point to just below the front part of the stage. The vertical direction of the microphones should be determined during the performance rehearsal. We recommend using unidirectional microphones because it is easy to set the sound. If you are using stereo microphones, set them at an angle between 90 and 120 degrees to capture the orchestra or brass band. The height and vertical angle is the same as when using two microphones. Ultimately, it is important to test the setup during rehearsal.

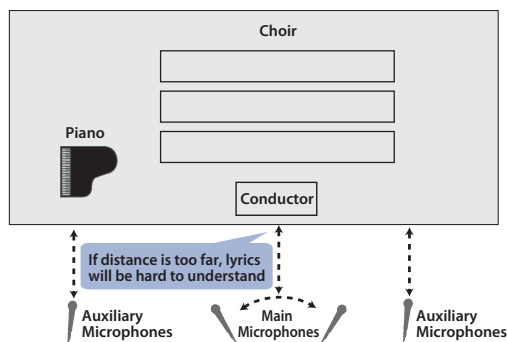


Recording in a Large Hall

At large venues, the sound from either end is always heard more faintly. To help with this, you can set auxiliary microphones by making use of the R-44 4-channel simultaneous recording feature. The auxiliary microphones should be placed about 1/3 of the width of the orchestra or brass band from each end. If you use these settings to record, it will be easy to adjust the balance afterwards. Also, you should place the auxiliary microphones with some separation from the main microphones and also use different settings (for example, separating the two auxiliary microphones by a large distance and pointing them up) for the auxiliary microphones to record the venue echoes.



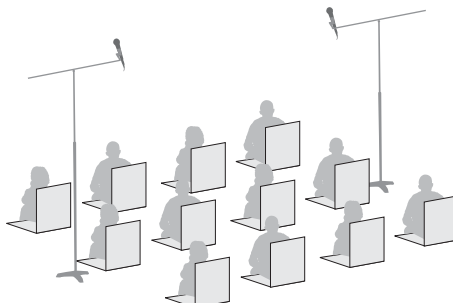
Recording a Chorus



Basically, the microphones should be positioned as described above. But, choruses have "lyrics." You should be careful not to place microphones too far apart because the lyrics may not be clear although you can record the atmosphere of the chorus. You need to balance the chorus with the volume of the piano accompaniment. The balance with the chorus may be difficult depending on the location of the piano. In these cases, you should use auxiliary microphones for recording and adjust the balance later.

Recording the Audience

You should also record the audience to capture the live feel of a performance. Set dedicated microphones for the audience to capture this feeling. The microphones should be set near the center of the audience seating. If you are using unidirectional microphones, point them up to record the reverberations of the concert hall. If the microphones are pointed down, it is difficult to capture the live feel because only certain members of the audience are recorded. You can also use stereo microphones, but you can get a better live feel by using two monaural microphones placed apart. Also, you can consider the omnidirectional microphone as an option to record the atmosphere of the concert hall.



Situation

4

Recording Outdoor Sounds

You can record the sounds of nature, like bird, cat, dog and other animal noises, the sound of rain, or the babbling of a brook. Here, we describe several tips on how to record in the outdoors.

1 Preparing to Record

- Connect a stereo microphone to the R-44.
- It is convenient to use a directional stereo microphone (CS-15R or CS-50) to record only what you are pointing at.



Record Settings

The following settings should be used if you are synching to video to make a DVD. Also, you should use the Pre Recording settings to prevent missing a recording.

Input Select	Analog	Sets the mode to record with an external microphone
Rec Freq.	48 kHz	Use 48 kHz if ultimately you are synching to video to make a DVD
Rec Bit	16 bit	Or it may be convenient record with 96 kHz if you want to save in high quality so that you can convert sounds to use with a DVD
Rec Mode	STEREO × 1	Setting to use one stereo system (2 channels) to record
Pre Recording	20 sec	Set to 15–20 seconds to prevent missing recording something
Project Name	Date	If you set the date, it is easy to know the recording date and time

For details on how to make recording settings, refer to the owner's manual.

2 Matching the Recording Levels

You should set the R-44 sensitivity (microphone sensitivity) high so you can record quiet sounds like wild bird song. This setting makes the microphone sensitive and even the quietest sound is captured. On the other hand, lower sensitivity is an appropriate microphone setting for loud sounds that are almost just noise, such as the sound a train makes as it passes.



You should check the input level after making these settings. Basically, check to be sure the C at the right of the level meter (clip level) when the loudest sound is heard.

For details on setting the input level, refer to the owner's manual.

3 Dealing with Wind Noise

If a strong wind hits the microphone, a muffled “wind noise” is recorded. At worst, the wind noise will be louder than the sound you want to record, which is one reason for ruining a clear recording. We introduce some ways of handling wind noise here.

1. Put a wind screen on the microphone.
The wind screen should stop most of the wind noise.



2. Turn [LOW CUT] ON.
Since wind noise is made up mostly of the low range, the noise can be reduced by cutting out the low range.



4-channel Recording

Recording with Surround Sound

Recently, words like surround sound and 5.1 channel have become common along with the popularization of DVDs. With the ability to do 4-channel simultaneous recording, the R-44 can make surround sound recordings.

Use four unidirectional microphones and set them on a microphone stand, as shown in the photo, to record the sound from four directions. If you use this setup to record, you can use a PC to convert to 5.1 channel / surround sound. Also, use a wind screen to cut down wind noise, as described earlier.

R-44 Setting : Rec. Mode in STEREO X 2

 For details see "Creating 5.1 Channel Sound Using a PC" on p. 18 in this guide



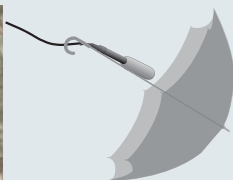
Simultaneously recording birdsong using multiple microphones

Try to record a point as close to the bird as possible. But, if you get too close to the bird, you won't be able to record the natural singing voice.

It is important to keep the bird from knowing that you are near. You should check the time and place where birds normally gather and set up multiple microphones, as shown in the illustration, in advance. Also, use long cables to connect the microphones to the recorder, hide in the shadows, and begin the recording as the birds begin to appear. If you do this, the birds won't notice that you are there, and you'll be able to record the natural sound of the birds.

Also, you can use an umbrella, as shown in the illustration below, in place of a parabola when recording distant sounds.

You can also make further use of the 4-channel simultaneous recording feature to set stereo microphones in two locations and select the sound from the microphones closest to the location of the birds.



An umbrella can be used in place of a parabola



When filming video, the sound quality is often insufficient. Using the R-44 allows you to record sound for video at a higher quality. Here, we describe several recording tips on how to record sound for video.

1 Advantages of Using the R-44 to Record Sound for Video

Using the R-44 to record sound for video has the following merits. You should try using the R-44 with video filming.

- **Better sound than recording with the video camera’s microphone**
Sampling rates up to 192 kHz are supported.
- **You can record sounds difficult to record from the video camera location**
Sounds that cannot be recorded by the video camera’s microphone can be picked up by the R-44. Sounds from another location can be recorded at the same time.
- **You can record environmental sounds and spoken lines separately**
- **You can capture the actual ambience of the location, and use your computer to convert it to 5.1 channel surround**
You can set microphones in four locations and change their position freely to create more realistic sound.

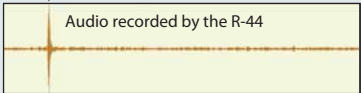
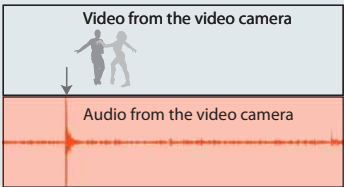
Synching Video and Audio

It is difficult to synchronize the video and audio during the editing process. But, with a little ingenuity, you can synch them easily.

Play a Baseline Sound and then Record

Clap your hands as the video filming begins as a signal to start recording.

By using this sound as a baseline, you can easily synch the timing between video and audio during editing.



Recording Settings

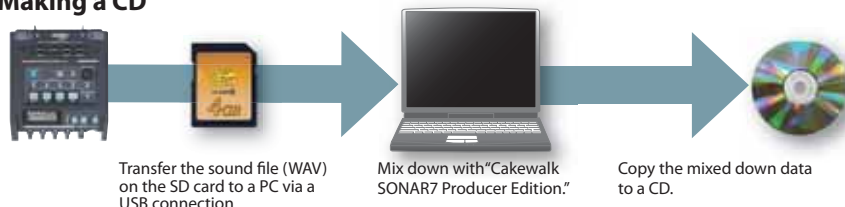
If the audio recorded for video will be used together with the video material to produce a DVD, we recommend the following settings. Also, you should use the Pre Recording settings to prevent missing a recording.

Input Select	Analog	Sets the mode to record with an external microphone
Rec Freq.	48 kHz	Use 48 kHz if ultimately you are making a DVD match to video, or if you are saving with high-quality sound, recording with 96 kHz makes conversion easier later
Rec Bit	16 bit	
Rec Mode	STEREO x 2	Setting to use two stereo system (2 channels) to record
Pre Recording	10 sec	Record ten seconds ahead so you don't miss anything
Project Name	Name	To help distinguish your projects, it's a good idea to give each scene its own unique project name

Creating CDs

Have you ever wanted to have someone listen to your music that you recorded? If so, CDs are better than cassette tapes. A CD is more likely to get heard because CD players, and CD car stereos are really common. Once you learn how, making CDs is easy, so you should learn how to do it.

Making a CD



If you've recorded four channels simultaneously on the R-44, and want to create a CD from your recording, you'll need to adjust the volume of the four channels and combine them into two-channel stereo data. This process is called "mixdown," and will allow you to create a CD that sounds the way you want. In this example, we provide a simple explanation of using the Windows software "Cakewalk SONAR7 Producer Edition" (sold separately) to turn the four channels of data (STEREO x 2) recorded by the R-44 into two-channel stereo, and use this data to create a CD. (For details, refer to the owner's manual or Help file of the software you're using.)

1. Manipulate the screen to adjust the volume of each channel.



2. Export the data.

The data format should be a WAV file at 16 bit/44.1 kHz.



3. Write the exported data to a CD.



If you know that you are going to create a CD from the beginning, we recommend recording with 16 bit/44.1 kHz on the R-44. Since this is the same as the CD specifications, it will take just a short time to convert the data.



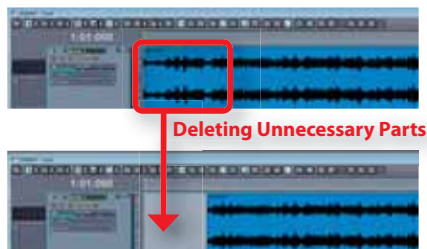
16 bit/44.1 kHz
for CDs

Deleting Unnecessary Parts

There are many cases when you'll want to edit the sound after recording, for example to erase the first five seconds that aren't needed.

In these cases, you can use the Windows version of the Cakewalk SONAR7 series (sold separately) to edit sound recorded with the R-44.

Unnecessary sounds can be easily deleted by selecting them and erasing them as shown below. (For details on operations, see the owner's manual or help for the software that you are using.)



Cakewalk SONAR7 Producer Edition Screen



Cakewalk SONAR7 Producer Edition

Although this software is music creation software, it has plenty of editing features for sound files, too. For example, you can easily create a non-stop melody by connecting several edited passages.

Creating 5.1 Channels

If you use the 4-channel recording as described in "Recording with Surround Sound" on p. 15, you can convert the sound to the 5.1 channel surround sound used by DVD software.

And if you then synch it to video, you will have a piece with the impact and realism of a movie.

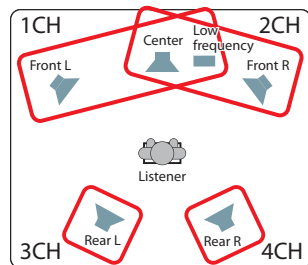
We introduce the procedure to convert 4 channels to 5.1 channels below. We use the Windows-compatible "Cakewalk SONAR7 Producer Edition" (sold separately) for conversion. (For details on operations, see the owner's manual or help for the software that you are using.)

5.1 Channel Surround Sound

The 5.1 channel surround sound system creates a realistic sound environment using 6 channels in a rectangle configuration. The six channels are in front of the listener (Center), to the right in front (Front R), to the left in front (Front L), to the right in back (Rear R), to the left in back (Rear L), and the low frequency channel. The low frequency channel is counted as 0.1 channel because it has a limited sound range.

Recording Settings

Set Rec Mode to STEREO X 2. If this setting is used to convert to 5.1 channel surround sound, you can manipulate two bits of data in two-channel units to make the conversion operation easier. Also, set the microphones so that channel 1 is the front left, channel 2 is the front right, channel 3 is the rear left, and channel 4 is the rear right. See the illustration at right for how the area recorded by four channels corresponds to the area for 5.1 channels.



Converting to 5.1 Channel Surround Sound

Load the data for the two projects (sound data recorded in stereo) to the PC, and convert to 5.1 surround sound using the surround pan feature of "Cakewalk SONAR 7 Producer Edition." First, display the screen shown in the illustration. Set the direction of sound for Front L, Center, and Front R with the project that recorded with channels 1 and 2. Determine the direction of sound for Rear L and Rear R with the project that recorded channels 3 and 4. (For details on operations, see the owner's manual or help for the software that you are using.)



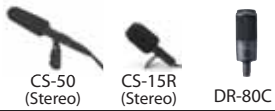

After making these settings, the exported sound data is the 5.1 channel surround sound data.

Microphones / Difference Between Sensitivity and Volume

Microphones




Microphone Types

There are two main types of microphone structures. It is important to choose the microphone best suited for the recording situation. For example, a bass drum produces high sound pressure levels, so it's best recorded using a dynamic microphones.

Type	Structure	Characteristic
Condenser Microphone	 CS-50 (Stereo) CS-15R (Stereo) DR-80C	A voltage is applied to electrodes, and the change in capacitance is converted to an electronic signal Although sound quality is superior in high-range attributes, it is susceptible to vibration and moisture and requires phantom power
Dynamic Microphone	 DR-50 DR-30	Converts vibrations to an electronic signal Although sound quality is not as good as a condenser microphone, it is resistant to vibrations and moisture and does not require phantom power

Microphone Directivity

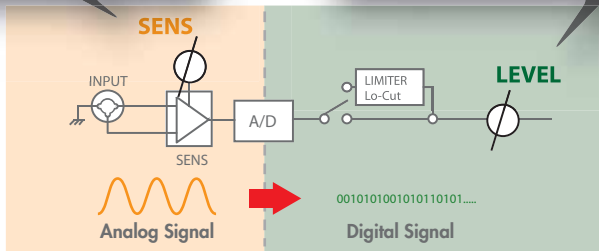
Different microphones can capture sounds in different directions. You should try changing the directivity of the microphone according to the recording.

Type	Characteristic	
Omindirectional	Microphones that have no directivity. Convenient when recording the atmosphere in concert halls. → The built-in microphones of the R-44	
Unidirectional	Microphones that have good sensitivity toward sound from the front of the microphone. Convenient to record only a specific sound. → CS-50 (Stereo), CS-15R (Stereo), DR-80C, DR-50, DR-30	
Bi-directional	These microphones have the highest sensitivity toward their front and rear. They can also be used together with a unidirectional microphone in an MS configuration to produce a stereo signal.	

Difference Between Sensitivity and Volume

Noise can be controlled by adjusting sensitivity to the largest value without distortion.

Noise can be controlled by adjusting sensitivity to the largest value without distortion.



Set LEVEL to the center, and adjust using SENS

Options

Stereo Microphones EDIROL CS Series



CS-50



CS-15R

Monaural Microphones Roland DR Series



DR-80C



DR-50



DR-30

Headphone



RH-300

Microphone Stand



ST-100MB

R-44 Specifications

Recorder Section

● Channels

4

● Data Type

Format : WAV/BWF

● Sampling Bit Rate

16/24-bit

● Sampling Frequency

44.1 kHz/48 kHz/88.2 kHz/96 kHz/
192 kHz

(Limited to 2 channels for 192 kHz)
* A combination of sample
size and sampling frequency
can be used.

● Recording Media

SDHC memory card
(compatible with 64 MB – 8 GB*)
As of November 2007.

● Recording Time using 8 GB SDHC card (minutes)

16 bit/44.1 kHz stereo	755
16 bit/48 kHz stereo	694
24 bit/48 kHz stereo	462
24 bit/96 kHz stereo	231
24 bit/192 kHz stereo	115
:	:
16 bit/44.1 kHz 4 ch	377
16 bit/48 kHz 4 ch	347
24 bit/48 kHz 4 ch	231
24 bit/96 kHz 4 ch	115

* These recording times are
approximate. They may change
depending on the specifications
of the card you use.

* If there is more than one
recorded file, the total recording
time will be less than listed here.

* Files up to 2 GB can be
handled. If the file size reaches
2 GB during recording, the file
is closed, a new file is created,
and recording continues.

Audio Input/Output Section

● Analog Input

Ch 1 – 4 : XLR/TRS Combo type
XLR type (phantom powered)
TRS type (balanced/unbalanced)
Stereo Built-in Microphones

● Analog Output

Ch 1 – 4 :
RCA Pin type (line output)
Headphone :
Stereo Phone type (1/4 inch)

● Digital In/Out

RCA Pin type (IEC 60958-3)

● Input Impedance

XLR : 4 k ohms or greater (balanced)
TRS : 6 k ohms or greater (balanced)

● Nominal Input Level

Input SENS knob : +4, -2, -8, -14,
-20, -26, -32, -38, -44, -50, -56 dBu
(eleven steps)

* Input Level Knob : Center

Input Level Knob:
negative infinity to +8 dBu

● Maximum Input

+24 dBu (Input Sens Knob : +4 dBu)

● Output Impedance

Line Output : 600 ohms

● Recommended Load Impedance

Line : 4 k ohms or greater
Headphone : 16 ohms or greater

● Output Level

Line output : -20 dBu (fixed)
Headphone : 40 mW + 40 mW

● Total Harmonic Distortion + Noise

Line output : 0.02%
(Input SENS knob at +4 dBu,
measured at 22 kHz)

● Noise Level

Line Output : -10 dBu (Input Sens :
+4 dBu, Input Level : Center)

● Residual Noise Level

Line Output : -103 dBu (Input Sens :
+4 dBu, Input Level : Minimum)

● Frequency Response

20 Hz – 40 kHz (0/-3 dB)

● Dynamic Range

AD : 100 dB
DA : 104 dB

● Phantom Power

48 V +/- 4 V
8 mA per 1 channel (20 mA or
less for all channels)

Other Terminals

● USB Port

Mini-B Type Connector
USB 1.1 or 2.0 High Speed
(Mass Storage Class)

● Control Sync Jack

Stereo Mini Type Jack
Word clock sync and start/stop
remote control of 2 units

* Remote control function does
not guarantee the exact same
REC start time.

● Built-In Effects

- 3-Band EQ
- 6-Band Graphic EQ
- Noise Gate
- Enhancer
- Comp & DeEsser
- MS Mic Mixing

* Effects can be during recording
and playback.

* Effects are not available while
sample rate is set to 192 kHz.

Control Section

● Control

- Power Switch
- Hold Switch
- Input SENS Knobs
- Input LEVEL Knobs

- Monitor Level knob
- Phantom Power Switches :
CH1/2/3/4
- Limiter Switch
- Low cut switch
- Scrub (Value)
- Transport Buttons :
PREV (REW), NEXT (FWD), STOP,
PLAY/PAUSE, REC
- Marker Buttons :
CLEAR, I◀◀, ▶▶, MARK
- * Shared with cursor.
- Effect button
- System button (MENU)
- Display Button
- A-B Repeat Button

Others

● Display

128 x 64 organic EL

● Power Supply

AC adaptor (PSB-1U)
AA type battery x 4 (Alkaline or
NiMH only)

Battery life

Continuous playback	approximately 4.0 hours
Continuous recording	approximately 4.0 hours

* When using alkaline batteries,
44.1 kHz, 16-bit, stereo, with
phantom power off.

● Current Draw

1.2 A

● Dimension

157 mm (W) x 183 mm (D) x
61 mm (H)
6-3/16" (W) x 7-1/4" (D) x
2-7/16" (H)

● Weight



Weight : 1.3 kg

* Including battery and SD card.

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SDHC Logo is a trademark.



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