



Edirol R09HR and Zoom H4N



Practical Tips.

Refer to the [Edirol Handbook](#) and the [Zoom H4N Handbook](#) for more details

Questions

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1. What size SD cards are best to use with the Edirol R09HR and the Zoom H4N?

Trish Levido: In the Edirol handbook page 36, it lists Estimated Recording Times for SD cards up to 8 GB. However, on the actual recorder, under 'Recorder Setup' it only shows the 'Maximum File Size' to be 2 GB.

There is no problem using larger than 2GB sized SD cards in the Edirol R09HR, as when the machines were made the maximum size was 8GB. We recommend an 8 GB Minimum to allow for recording at archival quality standard: 'Rec Mode': WAV-24 bit, and 'Sampling Rate': 48 kHz. Recording mode. This 8 GB SD card will give you 440 minutes of recording time before you need to replace the card.

Diane Taylor : I have encountered problems using an 8GB card as the 8GB in the Edirol corrupted itself so I lost a section of the interview and had to redo. However, the latest models may have overcome any problem that may have been in the earlier models. I never use over 4 GB in any of my oral recording. I'm wary about some of the new HD cards as even my DELL has problems reading them, especially from the Video recorder.

Trish Levido: It appears that it comes down to old technology and perhaps between the Edirol R09 and the Edirol R09HR they changed the technology to allow for larger SDHC cards. The Edirol R09HR user's booklet list the amount of time you can record on 24/48 on an 8GB card SDHC card, so it appears that the Edirol R09HR can take at least this level of card.

Andrew Host : Even though the Edirol may take 8 GB cards, there will be a **maximum file size**. On the Zoom H1, and Zoom H4n the maximum file size is 2 GB. **So if you make a single recording at 48 kHz 24 bit that is longer than 2 hours and 4 minutes, the recording will automatically be split by the recorder into two files.**

2. Why does the display light on the Edirol go out after a few seconds of recording?

Trish Levido: See *Edirol Handbook*, p. 96. This was an issue for all the oral historians at Mosman Library, to find the way to ensure that the display screen stays lit up during the whole of the recording. This is vital for glancing at during the interview to make sure that all is working correctly.

The solution – however, **only when you are using mains power** is to go to 'Menu' switch, go down to 3. 'Display Setup', then to 'Display Timer' and set it at 'off'

The purpose of the timer in the first place is that if you are using batteries then having the screen lit for a long time, uses up a lot of battery power. We recommend that all oral historians use mains power, wherever possible however, if you are doing a field recording and are using batteries, then to light up the screen just press any of the buttons ABOVE the Record/Pause/Stop buttons, e.g. Menu, Finder, etc.

Dianne Taylor: I would recommend anyone use a set of headphones, even the smaller ones in just one ear, to monitor the recording. I am doing a lot of outdoor stuff so cannot use mains power, so the headphones are a necessity to monitor levels, power and any problems with card and recorder. The recommendation from the recording engineer at a course I did was that everyone should always use a set of headphones. I know that this can be a bit impersonal to some but small headphones, using one ear are a good way to monitor.

3. What does the plug in power switch on back of Edirol refer to?

The switch on the back which says 'Plug In' power, Edirol *Handbook*, pages. 11, 13, does not refer to battery or mains power to power up the *Edirol* recorder. It refers to using an external microphone only.

Edirol Handbook, p.101 under 'Input Set up', 'EXT Mic Type' - set for either MONO or STEREO.

Different types of microphones need different settings:

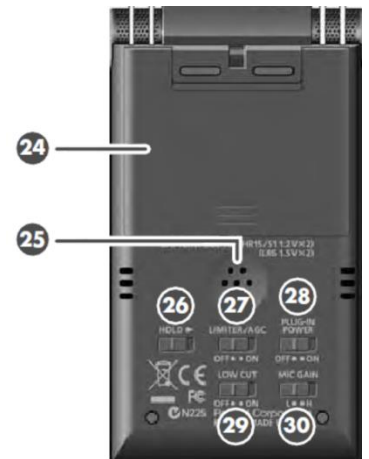
- **Dynamic microphones** and Condenser Microphones (such as recommended Rode M3) that has a battery in the microphone: **set to 'OFF'**.
- Condenser microphones that do not have inbuilt battery but require to be plugged into a power source: Set to **'ON'** for example: a microphone requiring a low voltage 'phantom' supply. Professional grade microphones require a 48 volt phantom power supply.
- Also if the switch is wrongly set to "ON" with a dynamic mic, or a condenser mic, with inbuilt battery, **the microphone may be damaged**. Note: 'microphone' NOT 'Edirol' might be damaged.

28 PLUG-IN POWER switch

Slide this switch to the appropriate setting when you've connected a plug-in powered microphone to the [MIC Input Jack **16**].

ON	Plug-in powered microphone is used.
OFF	Plug-in powered microphone is not used.

* When set to use plug-in powered microphones, using a dynamic microphone or a battery-powered microphone may cause damage.



For more information see *Edirol R09HR Handbook* pages 11,13 and 43.

4. Why is it that when using an external microphone (e.g. RODE 3) I have found that I have to set the Edirol in "Ext MIC setup" to MONO when using an external microphone?. If I am going to use the Edirol's internal mics (which I never use) it has to be set at STEREO. So, I set mic setup at MONO for an external plug in mic.

Norm: The reason is that the Rode M3 microphone is a mono microphone. You do not HAVE to set it to mono, but if you do not, the recording will only be on the L channel and the R channel will be empty. That's why you need to set it to Mono on the front of the recorder.

Generally, the rule is to set it at MONO for an external plug in mic, because the external microphone one is using MAY be stereo. **The setting should be chosen for the microphone being used.**

Trish Levido: A reason for recommending the *Zoom H4n* over the Edirol is that it offers support for TWO independent external microphones, e.g. *Rode M3*, which then give you **stereo** on your recording, and **whose volume levels can be manipulated separately**, on the recorder rather than moving the microphones closer or father away to the speaker, or changing the input levels.) **The recommended RODE M3 microphone is mono.**

5. What does the LIMITER/AGC switch function do?

Trish Levido: The LIMITER is useful to control sudden peaks of recording level that may otherwise distort the recording.

However, the LIMITER switch does not allow you to increase the volume if your interviewee is softly spoken or decrease (if you find the PEAK light keeps coming on in the interview).

If you want to change the volume then you **need to switch on the AGC.**

The purpose of the AGC (Automatic Gain Control) switch is to record people both near and far (such as in a meeting) at the same input level. You will have a choice to either have the 'LIMITER' on or the 'AGC' on **depending on which is going to be more use to you.** If for instance you were interviewing a couple of people at the same time, the 'AGC' setting may be advantageous, over the 'Limiter' setting.

Having the AGC 'ON' is also better, because it frees you from having to keep moving the 'In-put' levels on the recorder, to keep up with the volume levels of the people speaking. It 'evens out' the recording and controls distortion.

The AGC will even out inconsistent levels. But beware of using the AGC where there is background noise, because during pauses in the speaking the background noise may be raised to annoying high levels.

Setting the LIMITER/AGC switch function. *Edirol Handbook, Page 102.*

There are two ways of enabling this switch. One under 'menu' and the other by the 'LIMITER/AGC' switch on the back of the recorder.

The Limiter/AGC switch on the back is overridden by the internal settings.

Normally it is set at 'off'. When it is set at 'off' it records sounds without changing them. **If it is set at 'on' it will turn the Limiter/Auto Gain Control on.**

Once you have used the internal menu to choose between LIMITER or AGC, it is enabled or disabled using the 'LIMITER/AGC' switch on the back of the recorder.

6. What does the LOW CUT switch on back of the Edirol recorder do?

This switch is used to modify the input from the microphone. It is usually set to 'OFF'. (*Edirol Handbook R09HR p. 13.*) You can control switching between LIMITER and AUTO GRAIN CONTROL by using the front Menu screen, p.102.

- **One use of LOW CUT is when speaking very close to a microphone.** When speaking close to a microphone, low frequencies are emphasised. This

27 LIMITER/AGC (Auto Gain Control) switch

This switch turns the LIMITER or AUTO GAIN CONTROL on or off. Ordinarily, it can be set to off.

Switching between LIMITER and AUTO GAIN CONTROL is performed on the <Menu Screen> [p. 102].

ON	Turns the LIMITER or AUTO GAIN CONTROL ON.
OFF	Records input sounds without changing them.



29 LOW CUT switch

This switch turns LOW CUT on or off. It is usually set to off.

ON	Records while cutting the lower range portion of the input signal. Turn on when breath noise (the sound of breathing while recording a voice) or wind noise (when recording outside) may be a problem.
OFF	Records without cutting the lower range.

is known in the recording industry as “proximity effect”. LOW CUT compensates for the proximity effect by reducing low frequencies. [Andrew]

- **Another use of LOW CUT is to reduce background rumble** caused by traffic which may be outside a building where the recording is taking place.
- **Yet another use of LOW CUT is in outdoor use when a breeze is present.** LOW CUT can reduce the effect of wind on the microphone, although it is best to avoid recording in a breeze.

NOTE: When using Headphones, ensure that under ‘Input Setup’ under Menu, that the ‘Rec Monitor (which are the external Headphones Switch) is set to ON.

7. How do I protect a recording from accidental deletion?

To prevent the loss of a recording before it has been safely transferred to a computer. **After you have made the recording, press ‘Finder’ switch on front of recorder and select the file(s) or folder(s) that contain your recordings.**

3 FINDER button

Shows a song list and allows names to be edited and songs to be deleted or copied.
→ “Basic operations” (p. 18)

On next screen select ‘2 Information’ then press the **Rec. button**. Scroll down through the information provided till it comes to ‘Write Protect’ and you can switch between ‘ON’ and ‘OFF’. *If you select On it means that it can still be downloaded to a computer*, but it helps to stop accidental deletion on the recorder. Once you have selected ‘ON’ for write protection, a lock is shown beside the file name under ‘Finder’.

Another way to prevent accidental deletion is by using the physical 'Lock' switch on the side of most SD cards. Only remember to un-lock the card before making your next recording. [Andrew].

8. How do you tell what type your microphone is?

By looking at the plug on the mic.

This is a picture of some typical **mono plugs**. Notice that while the body that you hold when plugging it in may be metal or plastic, the part that actually plugs in is metal with TWO metal bits separated by a plastic ring.



This is a picture of some typical **stereo plugs**. The part that plugs in consists of THREE metal parts separated by two plastic rings.



9. Why would you use XLR microphone Cables?

Andrew Host: The use of 3-core XLR cables for each channel of recording reduces the likelihood of external electrical interference (such as may be caused by fluorescent lights being switched on, thunderstorms or microwave ovens).

Three and a half millimetre stereo jacks are more prone to external interference because although there are 3 wires, they are shared between two channels. One wire for left, one wire for right, and the other being a common earth for both channels.

10. Why is it recommended to record at 48kHz/24 bit?

Andrew Host: Digital recording is performed by analysing an analogue electrical signal which represents a sound wave, and recording in a moment in time the level of that electrical signal using binary numbers (zeroes and ones).

48 kHz (or kilohertz), means that the electrical signal is analysed and recorded 48,000 times per second. For all practical purposes, humans cannot hear the difference between the audio CD standard of 44.1 kHz and the oral history standard of 48 kHz. **But it is best to record at 48 kHz simply because this has been set as a standard, and 48 kHz recordings use only a little more storage space than 44.1 kHz recordings.**

When the analogue electrical signal that represents sound is digitised, a sound level must be recorded. Using 16 bit resolution, there are 65,536 possible levels between complete silence and the maximum possible level. If the waveform happens to represent a number that is between one of the available numbers, it cannot be accurately recorded, and so the device must choose a number below or above the actual amount. This is known as quantisation error.

Too much quantisation error causes distortion of the sound. Thankfully, 65,536 increments of volume are enough for distortion to be kept below limits that most humans can hear. However, even though 16 bit allows 65,536 possible recording levels, 24 bit allows an astonishing 16,777,216 possible recording levels. This reduces quantisation error to such negligible amounts that the recording is, for all intents and purposes, identical to the original analogue waveform.

One hour of 48 kHz/ 16 bit stereo recording will use 660 megabytes of storage space. At 48 kHz/ 24 bit, the same hour of stereo will use 989 megabytes. If your levels are perfect and there is little background noise, no one will hear the difference between 16 and 24 bit when the spoken word is recorded. **But 24 bit comes into its own when the recording levels are a little too low and they have to be raised later using editing software.** A low level 24 bit recording increased to a higher level will sound noticeably better than a 16 bit recording in the same circumstances.

However, even if your recording levels are perfect, it is best to preserve the voices as best as possible while still keeping practical limits of recording size. Arguably, recording at 96 kHz/ 24 bit would be an even better representation of the original recording, but it's not worth using the extra gigabyte of data required to record an hour of audio at 96 kHz/ 24 bit because the increase in audible quality will be negligible for spoken word.

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Max Benyon, Electrical Engineer who now works for a Community Radio station.

Norm Champion who worked in the Electronics Section of TAFE for most of his working life.

Andrew Host, our Oral History NSW Treasurer who has worked with sound for over 30 years.

Trish Levido: *I should state that I do not have electronic engineering qualifications and I speak from the point of view of a novice to technology equipment generally.*
