

24 BIT RECORDING

EDR Extended Digital Resolution by STUDER

A 16 bit word resolution has become established throughout the entire audio industry.

Why now 24 bit?

In 24 bit technology the original analog signal can be recorded with a resolution that is 256 times more accurate than with 16 bit technology.

An analog signal basically has an infinite resolution. 16 bits allow only 65,536 steps for the approximation of the original signal. Not even close to infinity! By contrast, 24 bits yield a resolution of 16,777,216 steps.

From theory to practice

What are the advantages of 24 bit technology when the original is possibly limited to an 18 bit A/D conversion or when the final playback device is limited to 16 bit.

One significant advantage is the increased signal-to-noise ratio resulting in a much larger headroom without sacrificing resolution.

In most cases the recorded signal requires further processing, mixing, frequency response corrections, etc. Ideally, these tasks should also be performed in the digital domain to prevent unavoidable losses in D/A - A/D conversion. This work can be performed most conveniently on a digital mixing console for which the D827 MCH with the EDR option is the ideal partner.

Modern signal processor architecture, such as implemented in the STUDER D940 digital mixing console, use a resolution of up to 56 bit for all signal processing algorithms.

Why all the fuzz? A rule applicable to calculations with binary numbers states that the multi-

plication of two data words with the width «n» (i.e. «n» bits) results in the word width «2n». For example, when two 16 bit words are multiplied in a digital mixing console, the result contains 32 bits.

The axiom is:

keep the resolution as high as possible. It is desirable to maintain this high-resolution result as long as possible because losses occur inevitably in every conversion from a larger to a smaller word length.

The word length should only be reduced to 16 bits in the final processing step, for example in CD mastering.

Compatibility

A change to the DASH format does not make any sense. Compatibility must be maintained with the large installed base of over 1000 DASH multitrack machines.

How does the signal get into the machine?

Access to the EDR processor is implemented through the multichannel audio digital interface, MAD1 (simultaneous for all tracks, coaxial or fiber-optic) or the AES/EBU interface for up to 2 tracks simultaneously. Both these formats are already specified for 24 bit transmission.

16 or 24 bits - selectable

With the push of a button recording and playback of 48 tracks in 16 bit mode, or 24 tracks in 24 bit quality can be selected.

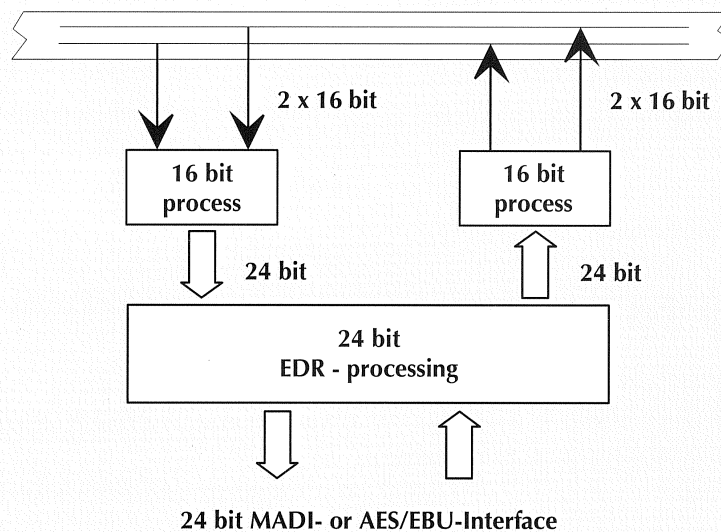
The solution is «Bitmapping»

Without modifying the DASH format, the EDR option for the D827 MCH realizes linear 24 bit recording of up to 24 channels. The data are distributed on the tape in such a way that high-order bits are recorded in the DASH format on tracks 1 to 24, where as low-order bits are recorded on tracks 25-48. There is a fixed track relationship: track number B is always A+24.

One advantage of this allocation is that a tape recorded in EDR mode can be played on a

standard DASH machine without any compatibility problems. The «A tracks» represent the recording in 16 bit quality while the «B tracks» are reproduced as «noise».

In order to continually preserve 24 bit quality, also during punch-in punch-out, cross-fades must be calculated with 24 bit resolution by the recorder. This task can only be performed with internal solutions such as the STUDER EDR processor.



Regardless of whether you are producing in «conventional» analog technology using the STUDER converters, or you want to record in 24 bit digital - or both -:

the **STUDER D827 MCH** is your ideal partner.

Technical Data

Channels for processing 24
 Word resolution: 24 Bit
 Allows to select between: 16 Bit 48 channels
 and 24 Bit 24 channels
 Accessible via: MADI (all 24 channels)
 or AES/EBU interface (2 channels at a time)

Order Information

EDR installation kit 21.863.666.20

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