1.5.4 String-buzz

If the string is plucked with little force, it reacts approximately as a linear system. This implies that double the initial displacement also leads to double the displacement at every moment during the subsequent vibration process. Of course, the displacement cannot become indefinitely large – at some point the string will hit the frets on the neck (Chapter 1.5.3, Chapter 7.12.2). If this contact to the fretboard happens right after the plucking itself, it becomes part of the attack process of the respective tone. Later occurring contacts to the frets (with the limit at later than about 50 ms) will become audible as single events – given they are strong enough. Weak or short string/fret contacts are, to some degree, a means of expression and therefore not generally undesirable.

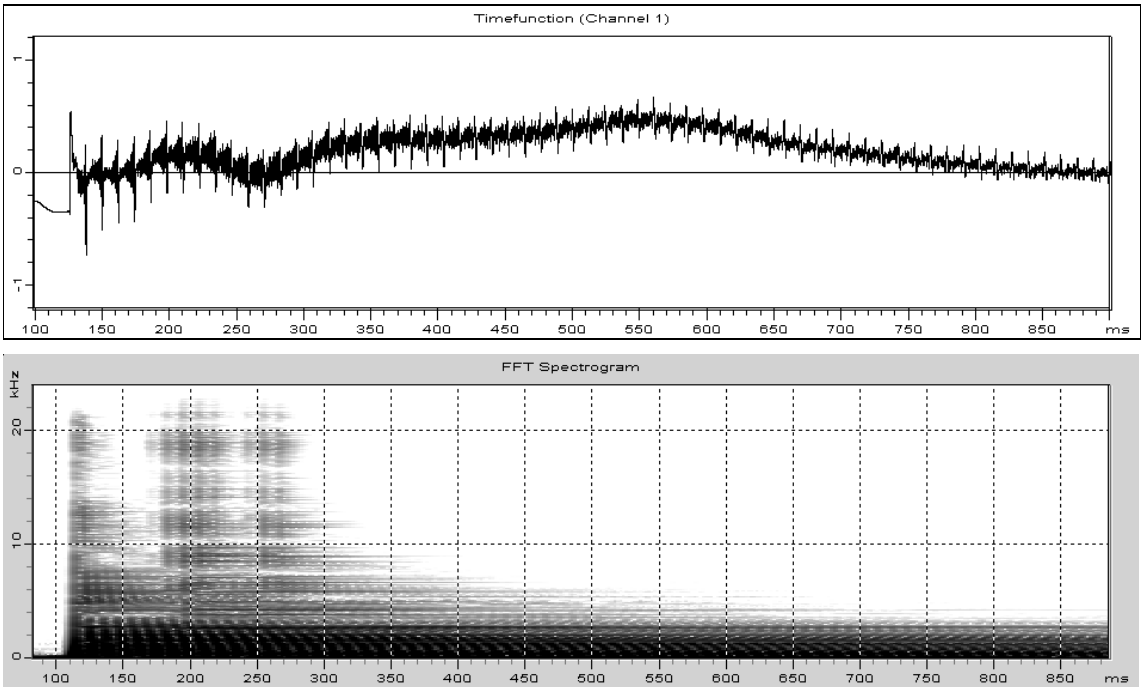

Fig. 1.40: Time-function and spectrogram of the piezo voltage resulting from a strongly plucked low E-string (E_2).

In **Fig. 1.40** we see the piezo voltage taken from an OVATION Adamas SMT (open E_2-string), with the string so strongly plucked with a plectrum that a clear buzz became audible. The spectrogram reveals – after the broadband first plucking impulse has passed – further string-to-fret hits around 200 and 350 ms; these act like high-frequency echoes. The string hits the frets repeatedly and strongly, and generates a clearly audible buzz.

Besides the impulses occurring with a separation of 12 ms, very low-frequency vibrations are visible in the time-function. These point to the reason why the string bounces off the fret not only at the very beginning of the vibration. However, an exact analysis of the low-frequency vibration cannot be derived from the time-function. This is because the cutoff-frequencies found in the piezo pickup, the amplifier and the analyzer at around 2 Hz result in strong phase shifts. The cause of the low-frequency signal components is a rotation of the plane of vibration (Chapter 7.7.4, Chapter 7.12.1).

 Translation by Tilmann Zwicker