

## Audio Frequency Analyser (FREQ)

The FREQ program reads audio input, and visualises the power in each frequency band in real-time on the screen. Connect a microphone or MP3 player to the line input to run the program.

The horizontal axis of the screen is time, and the vertical axis represents the frequency bands. The sound intensity is represented by colour—dark colours indicate little power in the band, and bright colours indicate high power. The power spectrum is updated in real-time using a sliding window, which represents about a second worth of audio.

Internally, the program computes a 512-sample FFT, and uses a lookup table to map the magnitude of each frequency onto a colour. The FFT is computed 200 times per second with a 75% overlap—128 new samples are appended to 384 of the previous samples and the FFT is computed over these 512 samples. The real and imaginary components are squared and summed, the sine and cosine parts are then added, and the resulting value is used to lookup a colour.

