



Pitch Detection, Harmonics, and Signal Quality

<https://musicreason.com/resources/pitch-detection-harmonics-and-signal-quality/> · Last updated 2026-09-06

A real musical note is almost never a single pure tone. It is a fundamental frequency plus a series of harmonics above it, and a pitch detector's job is to identify that fundamental correctly, under real-world noise, clipping, and note overlap, rather than mistaking a strong harmonic for the true pitch.

A 440 Hz note is never really just 440 Hz

A note at a 440 Hz fundamental also carries energy at 880 Hz, 1320 Hz, and further integer multiples, its harmonic series. [Harmonic Series Explorer](#) shows this structure directly; [Microphone Tuner](#) has to correctly track the fundamental specifically, not just the loudest frequency present.

Monophonic scope is a deliberate boundary

Reliably separating multiple simultaneous notes (polyphonic pitch detection) is substantially harder and less certain than tracking one periodic signal. Scoping Microphone Tuner to one note at a time keeps its confidence claims honest rather than overreaching into a much less reliable problem.

Silence, noise, and clipping each get checked before a result ships

[Spectral Peak Finder](#) and [Spectrum Viewer](#) both surface signal-quality evidence (clipping, noise floor, silence) as part of their reported result, not hidden behind a single confident-looking number.

[Intonation Drift Tracker](#) applies the same quality gating across a sequence of estimates over time, not just a single frame.

A "no result" outcome is correct behavior, not a failure

When a signal is too quiet, too noisy, clipped, or otherwise fails a quality gate, Microphone Tuner reports no result rather than guessing. See [Why Audio Recognition Is Ambiguous](#) for how this fits the site's broader confidence-labeling policy.

Frequently asked questions

If a note is rich in harmonics, can Microphone Tuner mistake a harmonic for the fundamental?

This is exactly the kind of failure mode its quality gates exist to reduce: a periodic-signal estimator has to distinguish the fundamental from its own overtones, and a low-confidence or no-result

outcome is the honest response when that distinction is not clear.

Why is Microphone Tuner scoped to one note at a time (monophonic)?

Reliably separating multiple simultaneous notes (polyphonic pitch detection) is a substantially harder, less certain problem than tracking one periodic signal. Scoping to monophonic input keeps the confidence claims the tool does make honest.

Is "no result" a failure of the tool?

No. When a signal is too quiet, too noisy, clipped, or otherwise fails a quality gate, returning no result rather than a guess is the correct, specified behavior, not a bug.

Where this shows up

AUDIO ANALYSIS

Microphone Tuner

AUDIO ANALYSIS

Spectral Peak Finder

AUDIO ANALYSIS

Spectrum Viewer

PITCH AND TUNING

Harmonic Series Explorer

PITCH AND TUNING

Intonation Drift Tracker