



# “Oscillators 101” (outline)

## Oscillator Basics

- History of Oscillator (clocks & navigation)
- The Resonator – natural frequency of physical vibration
- Types of Oscillators

## Resonator Based Oscillators

- Lumped Element (RLC) Tank Circuits
- Ceramic Resonator based Oscillators
- Piezo-electric Resonator Oscillators
- Resonate modes of operation

## Other types of Oscillators

- Clocks
- Rubidium & Cesium

## Parameters that separate Oscillators into a variety of categories

- Phase Noise
- Frequency and Temperature Stability
- Oscillator Aging
- Pushing and Pulling oscillators

## Frequency Synthesizers and direct digital synthesis (DDS) – a primer

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