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FREQUENCY SYNTHESIZER

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At the moment, there is a rapid development of electronic systems, which necessitates the constant improvement of technical characteristics, expansion of functionality, reduction of dimensions, cost and energy consumption.

Frequency synthesizers are an important part of modern radio electronics and are important functional nodes of electronic systems. The main function of this electronic circuit is to generate a frequency range from a single reference frequency. Frequency synthesizers are used in many modern devices, such as televisions, radios, walkie-talkies, mobile phones, cable TV converters, satellite receivers and GPS systems.

Among the methods that the frequency synthesizer uses, there are methods of frequency multiplication, frequency separation, digital synthesis, frequency and phase mixing.

Modern devices must provide frequency stability, a wide range of generated frequencies with a small step, a low level of phase noise and spectral side components. This device should have a high speed of adjustment from one frequency to another, which ensures good performance, and this is important for modern technology. Stability is usually achieved by using phase-locked frequency tuning or direct digital synthesis (DDS) using a reference oscillator with quartz stabilization. Frequency synthesis provides much higher accuracy and stability than traditional electronic oscillators.

There are analog and digital frequency synthesizers. Direct analog synthesizers are characterized by high switching speed (nano- or microseconds), the use of components with a low level of intrinsic noise relative to the noise of the source. The disadvantage is the limited range and resolution of frequencies. The solution of this problem is the use of direct digital synthesizer (DDS). It will increase the minimum frequency step. The main disadvantages are the limited frequency range and large signal distortion.