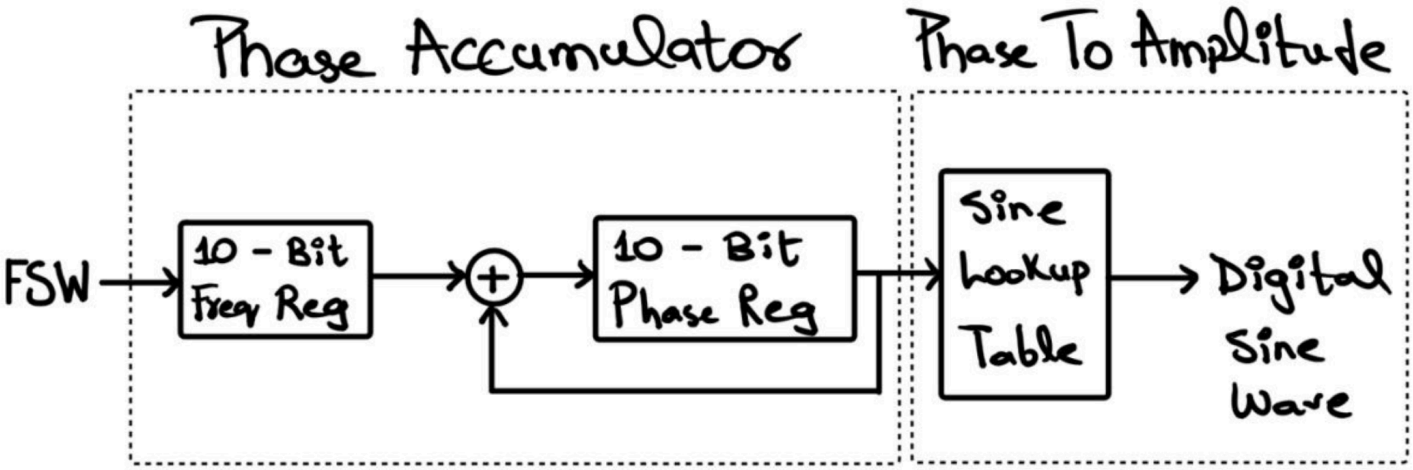
Direct Digital Synthesizer (DDS)



Direct Digital Synthesizers (DDS) are advanced electronic devices used for generating precise and stable digital waveforms. They have become fundamental components in modern communication systems, signal processing, and various electronic applications.

In a Direct Digital Synthesizer (DDS), the core components responsible for waveform generation are the phase accumulator and the phase to amplitude converter.

Phase Accumulator

The phase accumulator is a key element in DDS that generates a digital representation of the phase of the output waveform.

It operates by accumulating phase increments at a certain frequency, typically controlled by a reference clock.

The phase accumulator's output represents the phase of the waveform to be generated, where each digital value corresponds to a specific phase angle.

The phase accumulator's resolution, determined by the number of bits used, defines the granularity of phase increments and consequently the frequency resolution of the DDS output.

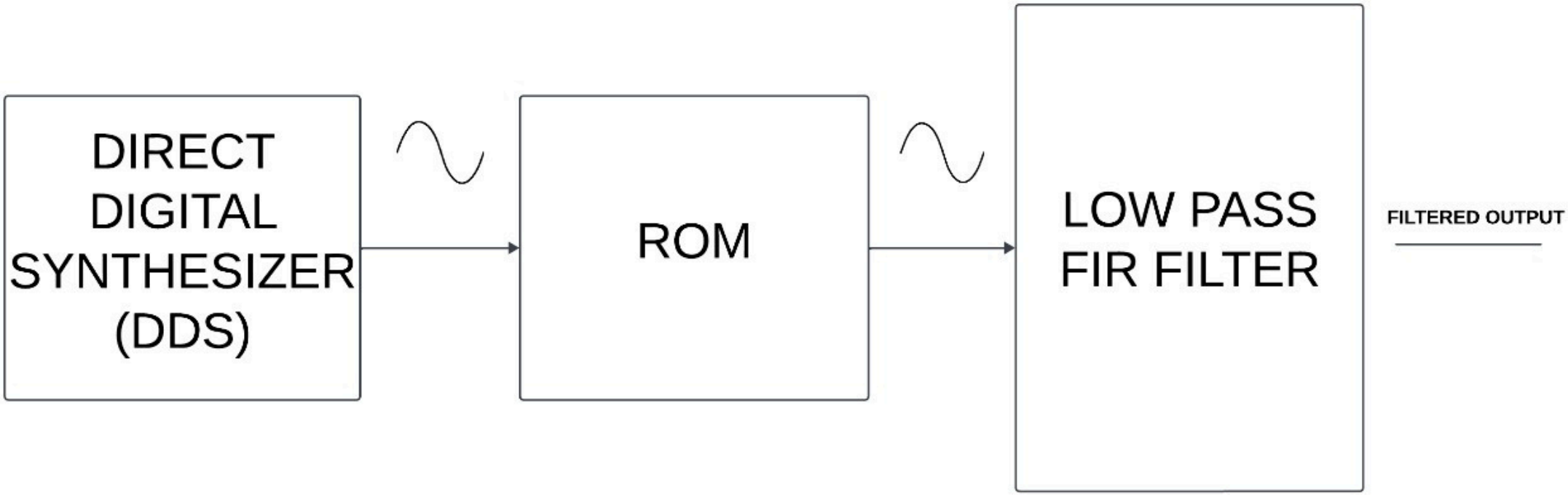
Phase To Amplitude

The phase to amplitude converter translates the digital phase information from the phase accumulator into an analog signal, typically a sinusoidal waveform.

This conversion is achieved through a lookup table or a mathematical function that maps phase values to corresponding amplitude values.

For example, in a sine wave generation scenario, the phase to amplitude converter may use a sine lookup table to convert digital phase values to analog amplitude values.

The output of the phase to amplitude converter is the desired waveform, such as a sine wave, with the correct frequency and phase characteristics based on the phase information generated by the phase accumulator.


DIRECT
DIGITAL
SYNTHESIZER
(DDS)
ROM
LOW PASS
FIR FILTER
FILTERED OUTPUT