

SELECTED TOPICS IN ADVANCED ELECTRONICS

Edited by
Khalid A. S. Al-Khateeb



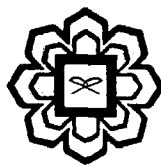
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CHAPTER 3

MEMS SURFACE ACOUSTIC WAVES OSCILLATOR

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Synopsis

One of the key circuits in communication systems such as telephone, mobile phone and remote sensors is the transceiver. And, one of the most important components in a transceiver is the oscillator. The oscillator provides a reference signal, or clock signal to facilitate the system synchronization, timing and signal modulation. It is important for the oscillator to produce a clean, smooth and stable output signal with clear a frequency spectrum.

1. Introduction

Oscillators can be classified into three main types namely; i) quartz crystal oscillators, ii) LC integrated oscillators and iii) MEMS based oscillators. The LC and MEMS oscillators are acceptable in many applications but, they still do not meet the high requirements set for the sophisticated communication systems. Thus quartz crystal oscillators are widely used today in modern consumer applications. The demand for quartz crystal oscillator has been increasing steadily between (4 ~ 10)% annually [2]. Quartz crystals have been scaled down in size significantly to fulfill the consumer product demands for size and portability. However, quartz crystals cannot be integrated on silicon chips because they have to be fabricated on piezoelectric substrates. Figure 1 is a block diagram illustration of a transceiver section in a radio system.