

# SELECTED TOPICS IN ADVANCED ELECTRONICS

Edited by  
Khalid A. S. Al-Khateeb



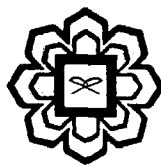
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## CHAPTER 2

### VOLTAGE CONTROLLED OSCILLATOR FOR STANDARD GSM USING MEMS

By

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#### **Synopsis**

The use of Micro Electro-Mechanical Systems (MEMS) in electronic circuits has become more popular recently due to their ability to incorporate both mechanical and electronic characteristics of highly precise components in a variety of applications. In this chapter a specific type of circuits will be treated in details due to the high demand for it in a number of popular electronic gadgets and equipment; namely the Voltage Controlled Oscillators (VCOs). It will be shown that these components and the circuit can meet the stringent requirements of wireless communication applications such as GSM cellular telephony. Of specific interest is that this VCO meets the low phase noise specifications of -136 dBc/Hz at large offset frequency of 3MHz, over the appropriate frequency range. The model of the monolithic VCO is based on the topology of the Colpitts Oscillator. It is relatively less complicated, which facilitates the practical integration of the MEMS components into the configuration. The variable capacitor and the monolithic 3-D coil inductor are suitable for low phase-noise and low power consumption at the application frequencies. A PSpice simulation model can be developed with MEMS switching devices which can be integrated into the system. The model helps in determining the design parameters, which affect the performance and operation reliability of the RF transceiver system, for which a prototype has been tested and proved successful.