

This paper presents a real-time feedback control system for evanescent-mode cavity filters. The control loop monitors the frequency of each cavity in the filter and adjusts the bias voltage on the tuning piezoelectric actuator based on the monitoring data, such that each resonator of the filter is at the desired frequency. The control system can tune the filter regardless of any effects from hysteresis or creep. While applicable to a variety of filter structures, the presented control system has been validated on a second-order bandstop filter built using a standard PCB process. The control system can successfully tune the filter from 0.9 to 1.45 GHz (550-MHz tuning range or 61%) without affecting the RF performance. The control system is fully electronic with a digital interface for easier integration. It also exhibits a measured frequency resolution of 33-6 MHz (or 3.5%-0.4%).