

Using the Optoelectronics N100 with Scanners and Receivers

In response to customer requests, Optoelectronics has developed the N-100 notch filter for use with frequency counters to eliminate FM broadcast signals. It is called a notch filter since when looking at a plot of attenuation versus frequency, the filter appears as a deep notch over 88 to 108 MHz, passing all signals except those within that narrow range. While this filter, the N100, was designed for use with frequency counters to eliminate spurious counting from strong local FM stations, in practice it finds wide application with other radio equipment.

In the past, most broadcast stations were placed outside of urban areas, where land was inexpensive. Broadcast interference was uncommon since few people lived near high power broadcast stations. As populations expand, it has become common to find broadcast towers located near suburban neighborhoods. Putting a 100 kilowatt transmitter within a thousand feet of a TV set or scanner can have some unfortunate effects on the receiver. Signal levels far in excess of those anticipated by the radio's designers are present at the antenna terminals and tend to overdrive and saturate all but the most robust units.

Even if recognizable music is not heard as interference, intermodulation and desensitization may be present and reducing the affected receivers usable sensitivity. Wideband FM broadcast signals, especially in the case of their harmonics or intermodulation products, may not appear to be music but rather a choppy intermittent interference. Desensitization by the sheer amplitude of the FM broadcast signal may just reduce the receiver front end gain with little other evidence of overload and make the reception of weak signals impossible.

In all of these cases, there are only two solutions available - a better receiver or less FM broadcast signal. Owners of modern triple conversion (up conversion) scanners already have an advantage here since they are more resistant to this interference, but not immune. A directional antenna can null the FM broadcast signal but only at the expense of not receiving anything in that direction, as well as requiring an antenna rotator.

Another way of reducing the signal is often the best solution: an FM notch filter. This filter reduces the strength of 88 - 108 MHz FM broadcast signals by a factor of over 1000 (30 dB) while leaving the remainder of the spectrum unchanged. Simply inserting the N-100 between the antenna and receiver will reduce FM broadcast interference and allow modern receivers to reach their full performance.