Add a signal-strength display to an FM-receiver IC

The Philips (www.semiconductors.philips.com) TDA7000 integrates a Tmonaural FM-radio receiver from the antenna connection to the audio out-put. External components include one tunable LC circuit for the local oscillator,a few capacitors,two resistors,and a potentiometer to control the variable-capacitance-diode tuning. The IC has an FLL (frequency-locked-loop) structure.

The filtered output of the FM discriminator frequency-modulates the local oscillator to provide negative-feedback modulation.The result is compression of the signal at the output of the mixer.

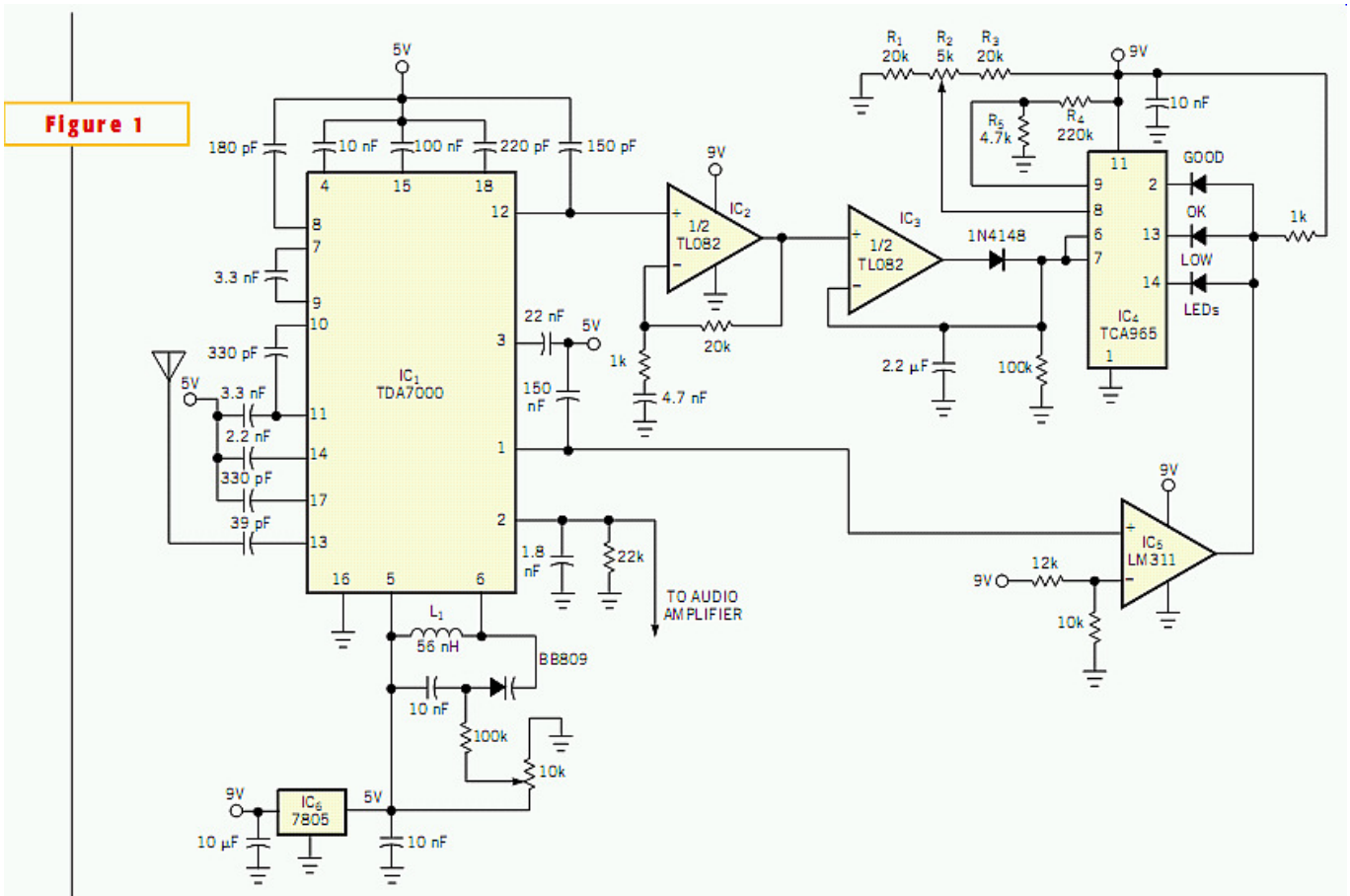
Thus,the IF bandpass filter and the FM discriminator deal with narrowband FM signals.For a compression factor ofK3, the original FM bandwidth reduces to 180/360 kHz.So,you need neither ceramic filters nor complex LC tank circuits to realize the IF filter. A simple active filter using op amps can fulfill the task. The IC incorporates a correlation muting system that suppresses interstation noise and spurious responses arising from detuning. The muting circuit uses a second mixer.Its output is available at Pin 1;you can use it to drive a detuning indicator.You can add a signal-strength display to the TDA7000 using the circuit in Figure 1.

You can obtain the information related to the intensity of the received signal at the output ofthe IF filter (IC1 ,Pin 12). You can easily process this voltage with common op amps,because the IF signal is centered on 70 kHz.The voltage at Pin 12 is dc-coupled to an amplifier, IC2 . Next,an envelope detector,IC3 ,yields a dc voltage proportional to the received-signal strength.

The Siemens (www.siemens.com) TCA965 window discriminator,IC4,compares this envelope voltage with a voltage derived from R1,R2,and R3 for the window's center (and R4 and R5 for the window's half-width).

Three LEDs show the result of the comparison (Low,OK,Good),but the display is valid only ifthe tuning is correct.If it's correct,the voltage at IC1,Pin 1 reaches its maximum value, and the LM311 comparator,IC5,enables the TCA965.

Figure 1



You can easily add a signal-strength indicator to the Philips TDA7000 FM-receiver IC