NEW IC ALLOWS FM RADIO TO FIT INSIDE A PENCIL

The TDA7000 integrates a mono FM receiver all the way from the antenna input to the audio output - external to the chip are only a tunable resonant circuit, fourteen ceramic capacitors, power amp and speaker/earphone. Total distortion is a remarkably low 0.3%.

This IC can dramatically reduce circuit and assembly costs, and allows FM radios to be made small enough to fit inside a pencil, wristwatch, cigarette lighter, calculator, matchbox, or even a key-ring. The IC can also be used as a receiver in a great variety of electronic equipment: cordless telephone sets, citizen-band radios, radio-controlled toys, paging systems, or the FM section of a TV.

The TDA7000 radically alters receiver design, and in doing so, the 10 - 14 receiver adjustments which are normally needed before a receiver leaves the factory have been cut to just one - for the upper frequency band limit. The intermediate frequency of the TDA7000 is only 70 kHz (compared with 10,7 MHz in a conventional receiver). Frequency demodulation with feedback is used to reduce the IF deviation to ± 15 kHz (the ± 75 kHz deviation which is common for FM would cause unacceptable harmonic distortion). With this low value, there is virtually no harmonic distortion.
The IF of 70 kHz gives excellent selectivity, and allows bandpass filters to be replaced by RC filters which can be partly or completely integrated onto the chip. Besides reducing component costs, this also eliminates the need for circuit adjustments.

Extra features are incorporated on the chip which are normally only found in high-performance FM receivers. Variable capacitance or electronic tuning (with search facility or pre-sets) can be implemented with much lower supply voltages than are normally required because variable capacitance diodes are needed only in the oscillator tuned circuit - not in the RF signal section.

One of the features of the IC is a patented muting circuit. This suppresses inter-station noise during tuning, as well as the two unwanted side tunings which are always present when FM signals are demodulated. The IC can also drive an LED or tuning meter to indicate maximum signal.

Using bipolar technology, the chip integrates about 280 circuit elements. The cut-off frequency of the on-chip transistors is around 350 MHz. The IC delivers a voltage of 70 mV into 22 kΩ; supply voltage range extends from 2.8 volts to 10 volts, and current consumption at 4.5 V is 8 mA. Chip area is 3.5 sq mm; the IC is encapsulated in an 18-lead plastic DIL (SOT-102A), type number TDA7000, or a 16-lead plastic mini-pack (SO-16; SOT109A), type number TDA7010T. A naked-chip version, type number TDA7010U, is also available.

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