FM STEREO RADIO SIGNAL PROCESSOR WITH RDS

TEA5991 the lowest cost for the best performances

The TEA5991 uses a full-CMOS design to deliver top performance, along with the industry's best sensitivity, at the lowest overall cost. It uses a new command interface that simplifies software development and system integration, and requires only 15 mm² of PCB space. New improved search algorithms decrease the scan search time and enable robust channel identification.

KEY FEATURES

- Industry-leading FM and RDS sensitivity
- New algorithm improves search time (< 8 seconds)
- Single-ended antenna input optimized for headphone wire
- Pilotless RDS feature enables RDS reception from FM mono broadcasts
- Power-saving modes
- Command-based interface for simpler software design and system integration
- Wide tuning range: 70 to 108 MHz, including 70-MHz China band
- Digital volume and balance control
- Internal auto store of up to 32 channels
- Low supply voltage: 2.4 to 3.6 V
- Flexible interfaces: I²C bus, SPI bus
- Small size: 4 x 4 mm HVQFN, 2.56 x 2.56 mm WL-CSP

KEY BENEFITS

- FM best-in-class: channel separation, sensitivity, selectivity, and sound
- Can be implemented with no external components
- Easy hardware and software integration
- Demo board with reference design available to enable smooth integration in customer platforms
- Complete design in less than 15 mm²
- Faster search time
- Excellent reception in urban areas due to improved multipath performance

TARGETED APPLICATIONS

- Mobile and portable devices

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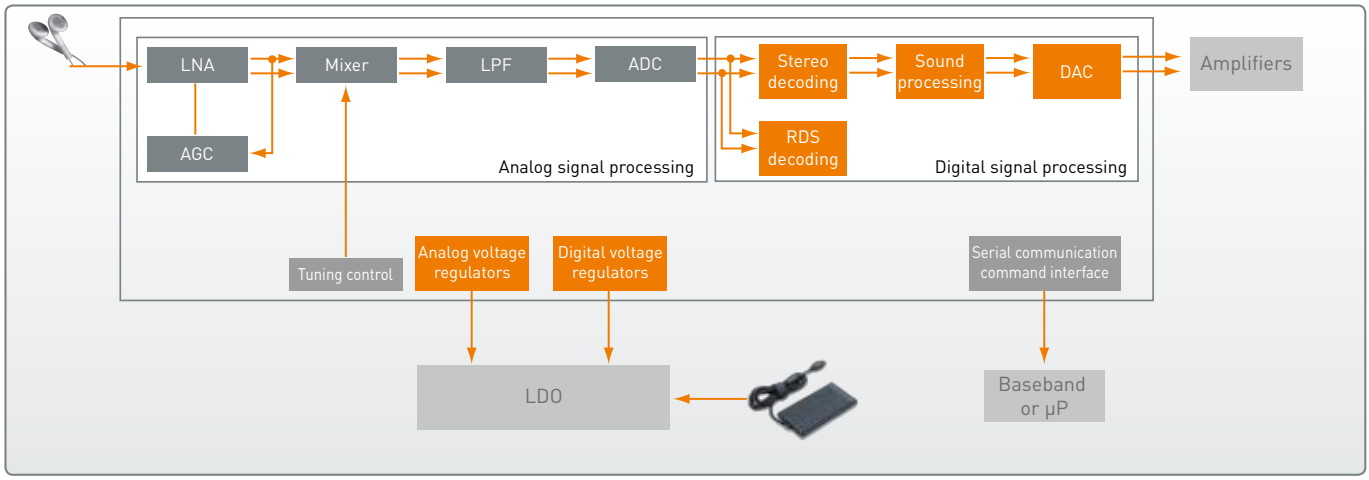

TEA5991 block diagram

The FM + RDS stereo radio IC, TEA5991, is the follow-on to the popular TEA5760, and TEA5766. This full-CMOS radio IC sets a new standard in radio performance, with better channel separation, industry-leading sensitivity, very high selectivity and superb sound. In addition, a new command-based interface simplifies software development and makes system integration easier.

The IC is available in an HVQFN or WL-CSP package. A complete radio can be implemented without external components. Adding two small decoupling capacitors to the design improves reception and sound quality. Even with the 2 extra capacitors, the design is very small, requiring less than 15 mm² of PCB space. Adding a pre-select filter in the FM antenna path can enhance reception quality even further.

The TEA5991 requires no alignment and uses a low supply voltage (2.4 to 3.6 V). The single-ended antenna input is optimized for a headphone wire. The radio offers a wide tuning range (70 to 108 MHz, including the 70 MHz China band) and uses a tuning grid of 50, 100 and 200 kHz. It has a very reliable and fast auto search with an internal auto store of up to 32 channels, and it supports dynamic adjacent channel suppression for better reception quality.

To make design-in more flexible, the TEA5991 supports the I²C and SPI buses (3- or 4-wire format). A digitally controlled algorithm supports seamless co-existence with GSM, Bluetooth, Wi-Fi and WiMAX. To save power, there is a standby mode for fast restart and a power-down mode for very low-power mode.

Package size	WL-CSP/UK: 2.56 x 2.56 x 0.6 mm HVQFN24: 4.0 x 4.0 x 1.0 mm
Required number of external components	None
Required PCB area	< 15 mm² for WL-CSP
Current consumption (typical)	22 mA
Channel separation	48 dB
Ultimate S/N (mono typical)	60 dB
FM sensitivity (at 26 dB S/N)	1.2 μV_{EMF}
RDS sensitivity (≥ 95 %, 2000 blocks)	12 μV_{EMF}
Audio THD (mono)	0.2 %
Typical supply voltage	2.7 V
Reference clock frequency	32.768 kHz ± 1024 Hz
Interface bus	I²C-bus, SPI

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