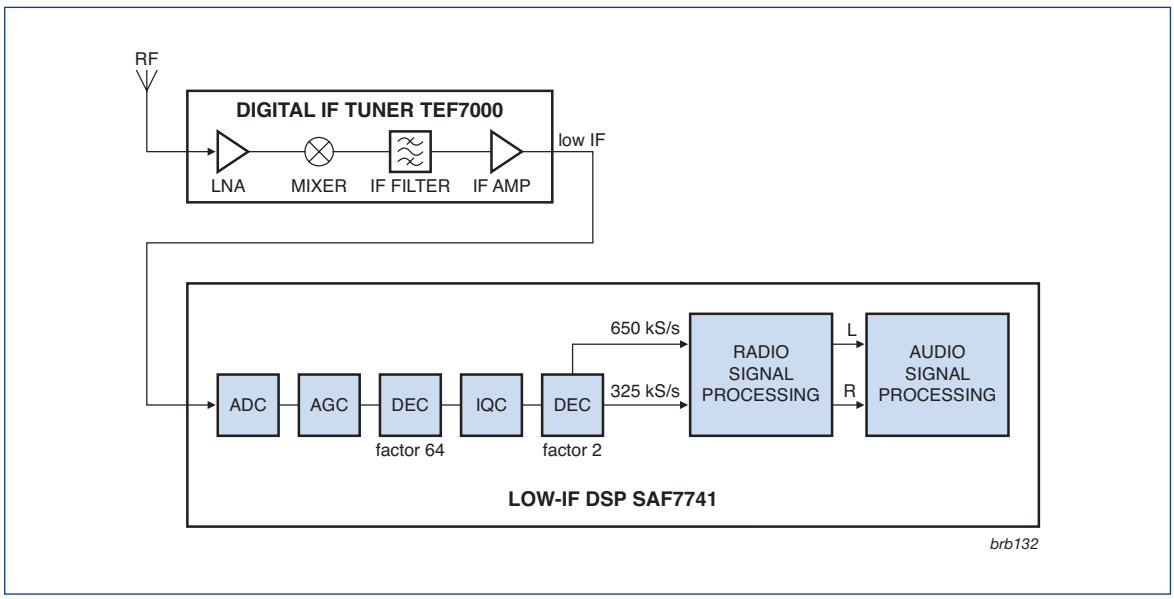
In designing this chipset, which allows the tuner to be included on the main board, a key goal was to incorporate all critical external RF components on chip. So the chipset is based on NXP's existing digital IF platform but also draws on the same principal behind our proven low-IF analog system architecture. Integrating key AM/FM front-end and IF circuitry and having the AGC and IQC in the digital domain helps improve overall performance. Importantly it also reduces the external component count by ~50% in systems using NXP's TEF6700 tuner / SAF7730 DSP combination.

This not only has a significant impact on system costs, it also simplifies overall design and manufacturing. And when pooled with software and hardware compatibility, this tuner / DSP system combination ensures a smoother customer R&D path with lower development costs for next generations of car audio / radio systems.

TEF7000 / SAF7741 chipset key benefits

- Easy to design
  - no critical external RF components due to highest integration
  - complete channel selectivity integrated
  - limited resources needed due to reduced complexity
  - total system pinning optimized for performance and PCB design
  - design optimized for lower EMC
  - continuation of existing system architecture
- Easy to manufacture
  - single layer PCB possible
  - full SMD application possible (no hand mounting)
  - less handling due to small number of external components
  - only one alignment needed
  - higher production throughput
- Low R&D costs for next generation audio / radio platforms
- Low risk and short time-to-market



AM/FM receiver chain

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PHILIPS

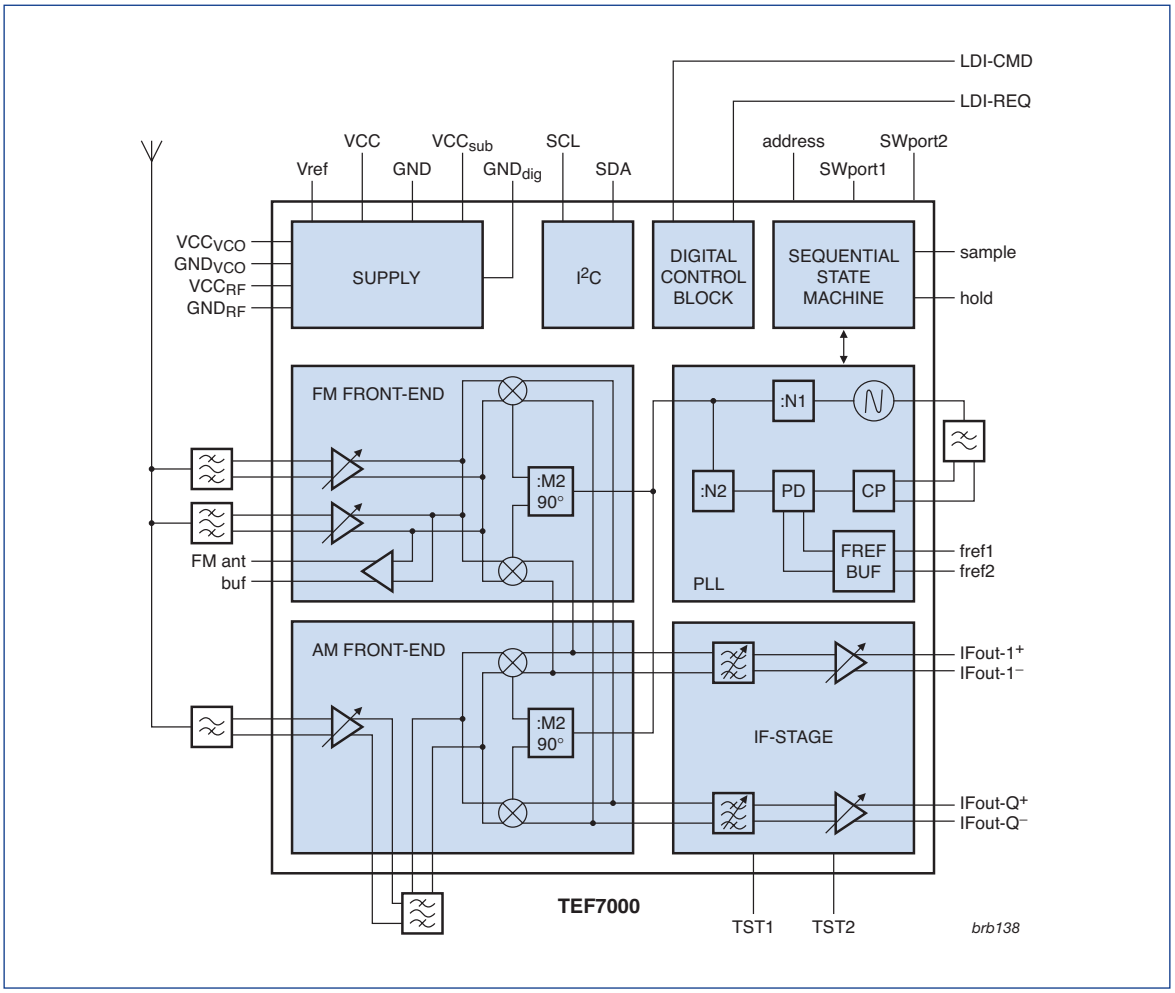
Maximize performance, minimize component count

Low-IF digital car audio / radio system solution

NXP founded by Philips

Car audio / radio that sounds better with less

At the heart of any in-car entertainment system is the main audio / radio board. Drawing on its proven technology, NXP Semiconductors leads the way in this area with its best-in-class tuner and DSP silicon solutions. Our latest dedicated low-IF digital chipset, the TEF7000 tuner front-end and SAF7741 software radio DSP, continues this innovative drive. It raises the performance bar for modern car radios while slashing external component count and PCB space by almost 50% compared to previous generations.



TEF7000 block diagram

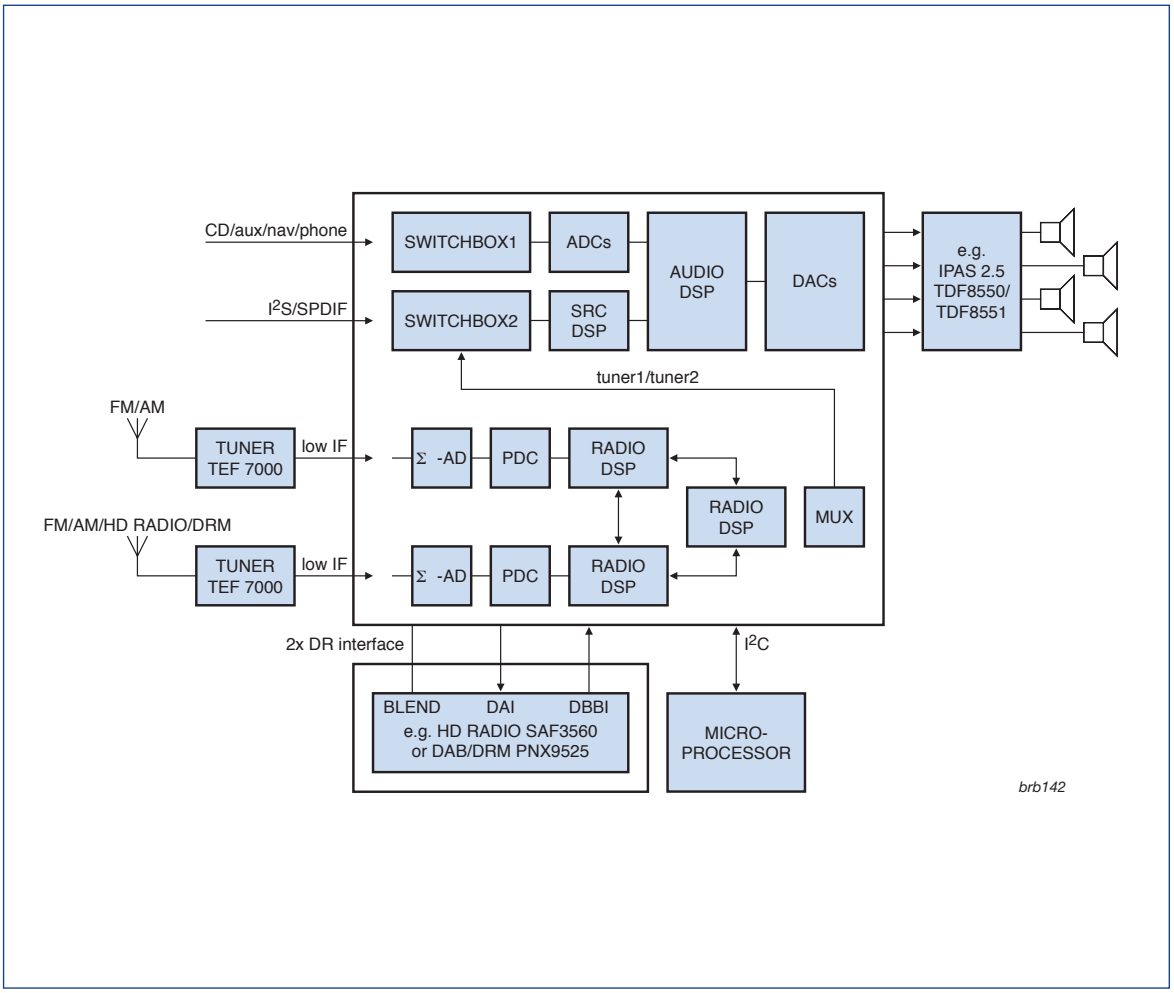
Digital low-IF car radio front-end TEF7000

Recent generations of NXP's one-chip digital IF tuners continue to expand the frontiers of front-end excellence. At the same time, increasing component integration reduces design complexity and cuts board space requirements. Our front-end tuner solutions offer many benefits including best-in-class radio reception, embedded IF signal processing, higher integration and lower system costs.

NXP has taken our low-IF global receiver approach to the next level with the TEF7000. Fully HD Radio and DRM compatible, this latest digital IF front-end incorporates all critical RF functionality allowing the tuner to be included on the main board and reducing external component counts to a minimum. The IC is also specifically designed to complement the digital-IF DSP back-end SAF7741, enabling an optimum partitioning of functions and signal interfacing.

Key features

- Global receiver
  - FM EU/US/Japan/Eastern Europe
  - Weather band
  - AM LW/MW/SW (full SW)
  - HD Radio and DRM compatible
- Low power (400 mW with 80 mA current) using a single 5 V supply voltage
- Small 48-pin package (HVQFN)
  - Only one tuner alignment for IF filter center frequency
  - No hardware alignments
  - No pre-aligned components in application
- Simplified and cost-effective implementation, eliminates the need for many external components including:
  - VCO coil and varicap diode
  - FM antenna varicap diode
  - FM PIN diodes
  - AM PIN diode
  - AM JFET LNA
  - IF transformer coil and ceramic filter(s)



SAF7741 block diagram

Digital low-IF DSP SAF7741

The signal processing engine at the heart of today's car radio units is often a dedicated car radio DSP from NXP. Our unique single-chip solutions replace fixed hardware design blocks with fully flexible DSP solutions. They give designers highly integrated, powerful and economical solutions that offer system and design flexibility by incorporating extensive functionality and including the most advanced processing algorithms.

All the devices in the family also feature fully integrated IF processing, significantly reducing external filter circuitry. A number of design changes have been implemented to further improve the robustness of the SAF7741, such as intelligent power management and clocking along with various ESD improvements. In addition, an improved grounding strategy results in less ground-bounce, better EMC and improved overall performance.

Key features

- Dual, low-IF car radio and audio software DSP
- Low-IF concept for high performance at reduced system cost
- New PDC including IQC
- Dedicated dual digital radio interface to co-processors for HD Radio and DRM
- Supports co-processors for any digital radio standard such as DAB/DMB and SDARS
- 5 audio ADCs and 6 audio DACs with improved sound taste
- 5 host I2S inputs and 4 host I2S outputs
- 4 independent I2S inputs with multi-channel in
- Support internal sample rate of 44.1, 48 and 96 kHz
- Robustness improvements including EMC/EMI and watchdog
- Improved power management features