TEXAS INSTRUMENTS

Micro-Module Integrated Bluetooth® 1.2 Baseband Controller and Radio

Check for Samples: LMX5452

FEATURES

- **Compliant with the Bluetooth 1.2 Core Specification**
- **-80 dBm receiver sensitivity (typical)**
- **Class 2 operation**
- **Low power consumption:**
  - **Advanced power management features**
  - **Clocking option 12/13 MHz with PLL bypass mode for power reduction**
- **High integration:**
  - **Implemented in 0.18 µm CMOS technology**
  - **RF includes on-chip antenna filter and switch**
  - **On-chip firmware with complete HCI**
- **Embedded ROM and Patch RAM memory**
- **Up to seven Asynchronous Connection Less (ACL) links**
- **Support for two simultaneous voice or Synchronous Connection Oriented (SCO) links**
- **Accepts10-20 MHz external clock or crystal network**
- **Fractional-N Sigma/Delta modulator**
- **Operating voltage range 2.5–3.6V**
- **I/O voltage range 1.6–3.6V**
- **60-pad micro-module BGA package (6.1 mm × 9.1 mm × 1.2 mm)**

INTERFACES

- **Full-duplex UART supporting transfer rates up to 921.6 kbps including baud rate detection for HCI**
- **Full speed (12 Mbps) USB 2.0 for HCI**
- **ACCESS.bus and SPI/Microwire for interfacing with external non-volatile memory**
- **Advanced Audio Interface (AAI) for interfacing with external 8-kHz PCM codec**
- **Up to 3 GPIO port pins (OP4/PG4, PG6, PG7) controllable by HCI commands**
- **JTAG based serial on-chip debug interface**
- **Single Rx/Tx-pad radio interface**

DESCRIPTION

The LMX5452 is a highly integrated Bluetooth 1.2 compliant solution. The integrated baseband controller and 2.4 GHz radio combine to form a complete, small form-factor (6.1 mm × 9.1 mm × 1.2 mm) Bluetooth node.

The baseband controller has a standard Host Controller Interface (HCI). Based on the National Semiconductor CompactRISCTM 16-bit processor, the LMX5452 is optimized to handle the audio, data, and link management processing requirements of a Bluetooth node.

The on-chip memory, ROM, and Patch RAM provide lowest cost and minimize design risk with the flexibility of firmware upgrades.

The firmware supplied in the on-chip ROM supports a complete Bluetooth Link Manager and HCI with communication through a UART or USB interface. This firmware features point-to-point and point-to-multipoint link management, supporting data rates up to 723 kbps.

The radio employs an integrated antenna filter and switch to minimize the number of external components.

The radio has a heterodyne receiver architecture with a low intermediate frequency (IF), which enables the IF filters to be integrated on-chip. The transmitter uses direct IQ-modulation with Gaussian-filtered bit-stream data, a voltage-controlled oscillator (VCO) buffer, and a power amplifier.

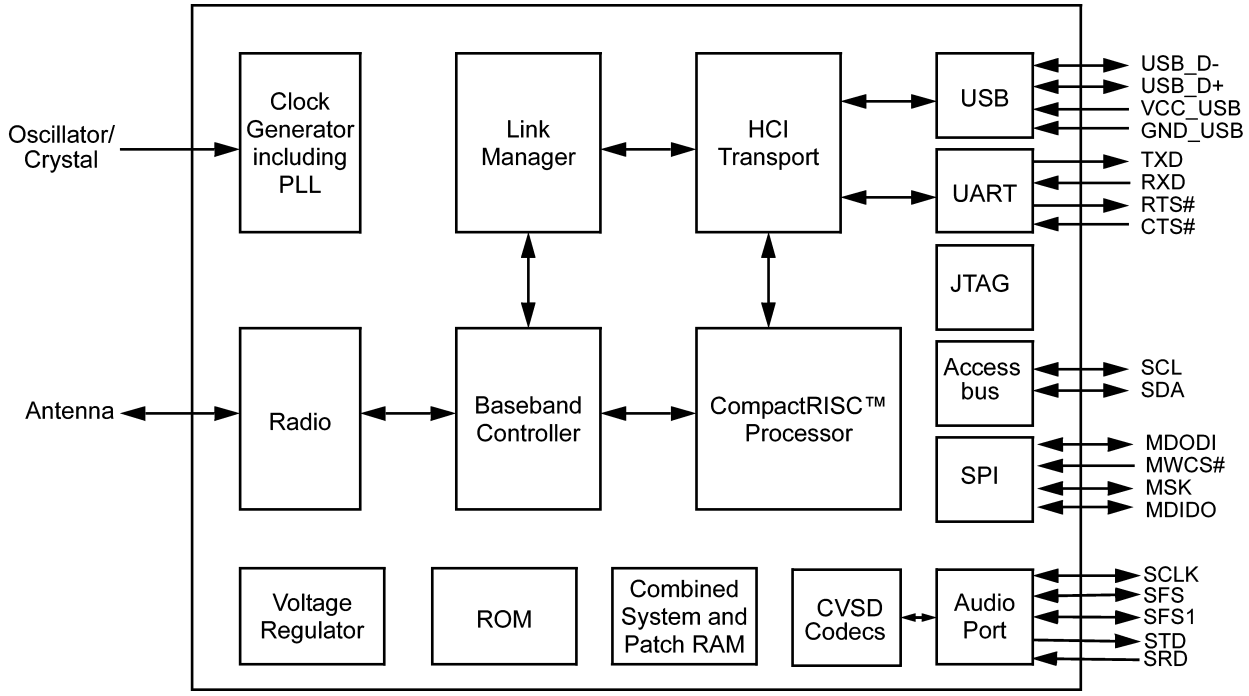
The LMX5452 module is lead free and RoHS (Restriction of Hazardous Substances) compliant. For more information on those quality standards, please visit our green compliance website at http://www.national.com/quality/green/

These devices have limited built-in ESD protection. The leads should be shorted together or the device placed in conductive foam during storage or handling to prevent electrostatic damage to the MOS gates.

Applications

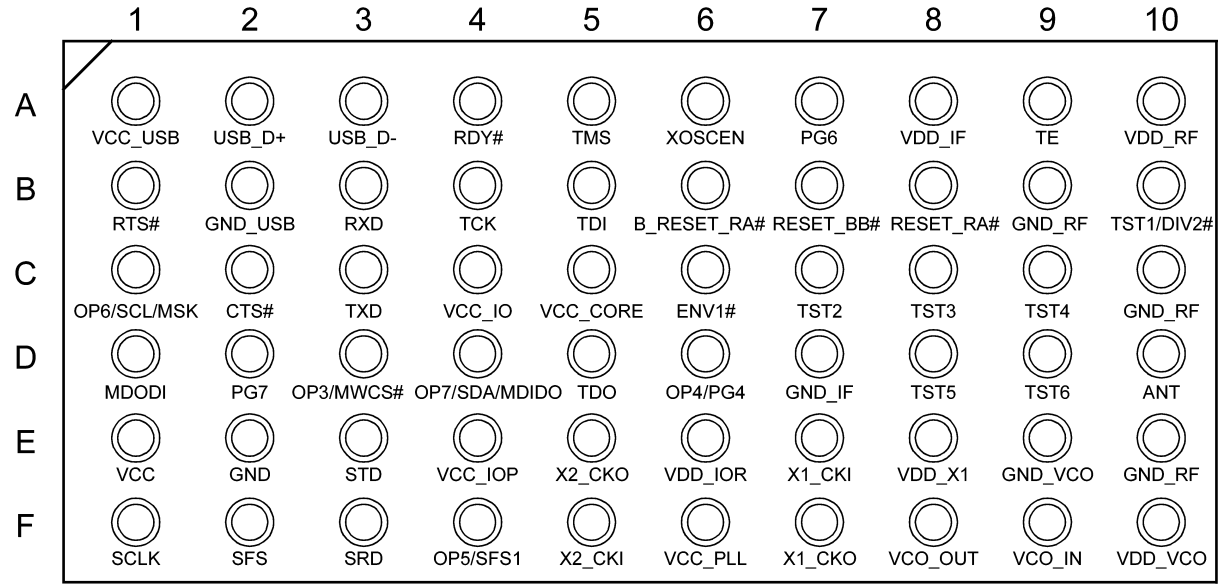
- Mobile Handsets
- USB Dongles
- Stereo Headsets
- Personal Digital Assistants
- Personal Computers
- Automotive Telematics

Functional Block Diagram



Connection Diagram

Figure 1. FBGA, Plastic, Laminate, 9x6x1.2mm, 60 Ball, 0.8mm Pitch Package



X-ray - Top View

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