

LMX5452

Micro-Module Integrated Bluetooth® 1.2 Baseband Controller and Radio

1.0 General 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 x 9.1 mm x 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/>

2.0 Applications

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

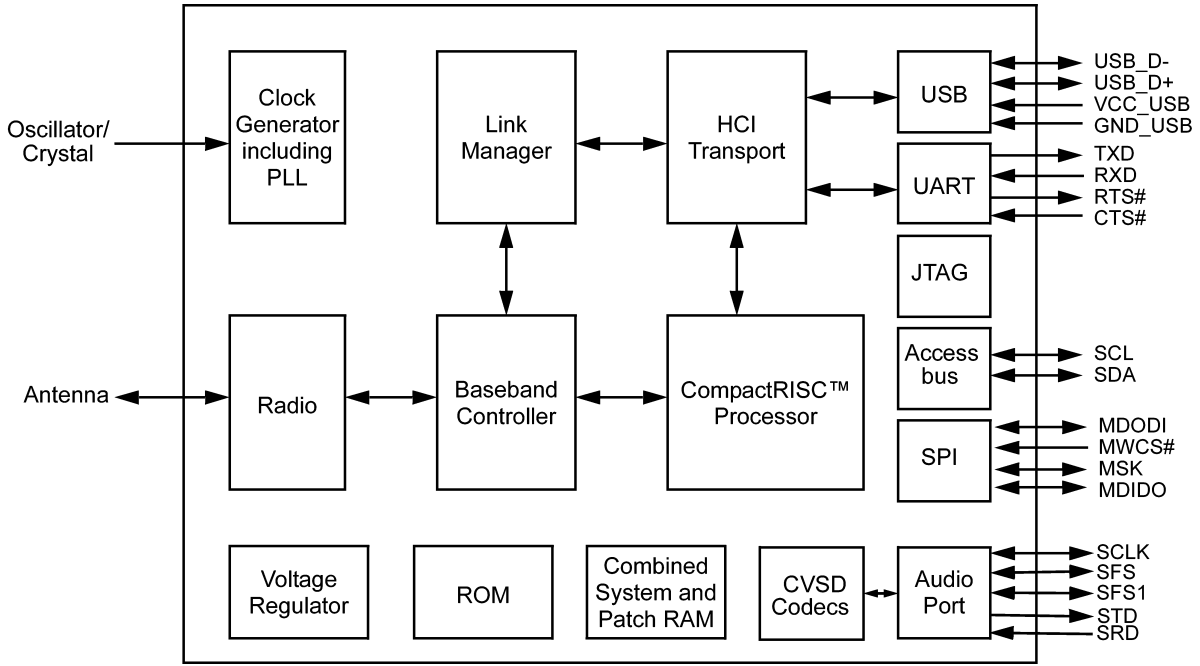
3.0 Features

- 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 μ m 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
- Accepts 10-20 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 x 9.1 mm x 1.2 mm)

4.0 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

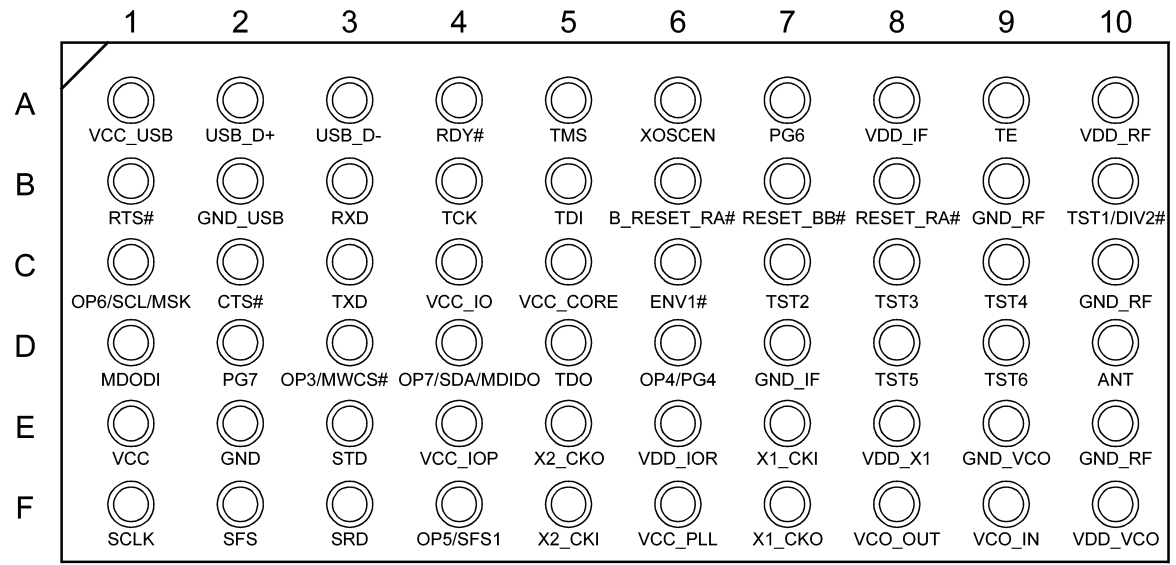
5.0 Functional Block Diagram



20180401

6.0 Connection Diagram

FBGA, Plastic, Laminate, 9x6x1.2mm, 60 Ball, 0.8mm Pitch Package (SLF60A)



X-ray - Top View

20180402

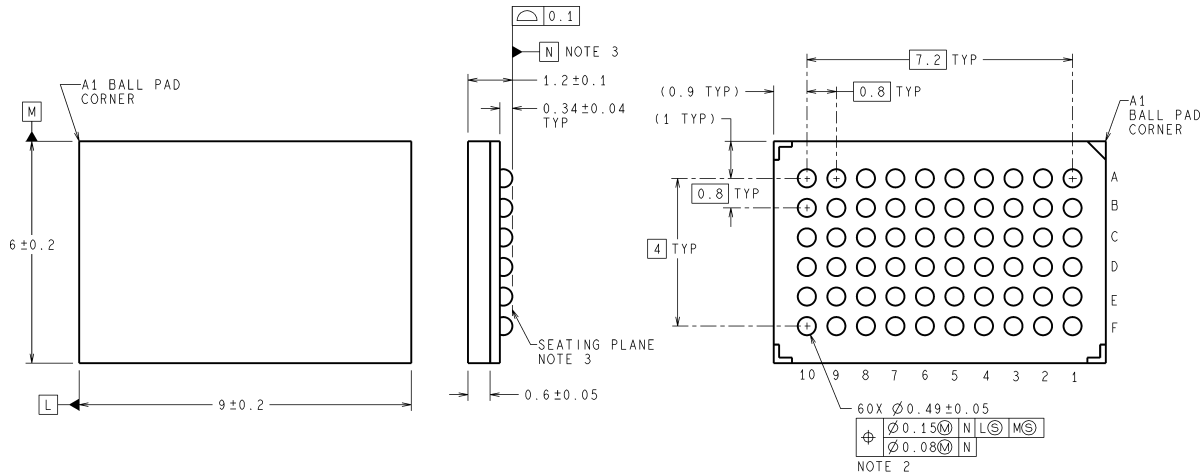
7.0 Ordering Information

Order Number	Spec.	Shipment Method
LMX5452SM		388 pcs Tray
LMX5452SMX		2500 pcs Tape & Reel
LMX5452SM	NOPB (Note 1)	388 pcs Tray

Order Number	Spec.	Shipment Method
LMX5452SMX	NOPB (Note 1)	2500 pcs Tape & Reel

Note 1: NOPB = No Pb (No Lead)

8.0 Physical Dimensions inches (millimeters) unless otherwise noted



SLF60A (Rev A)

**FBGA, Plastic, Laminate, 9x6x1.2mm, 60 Ball, 0.8mm Pitch Package
NS Package Number SLF60A**

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