

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

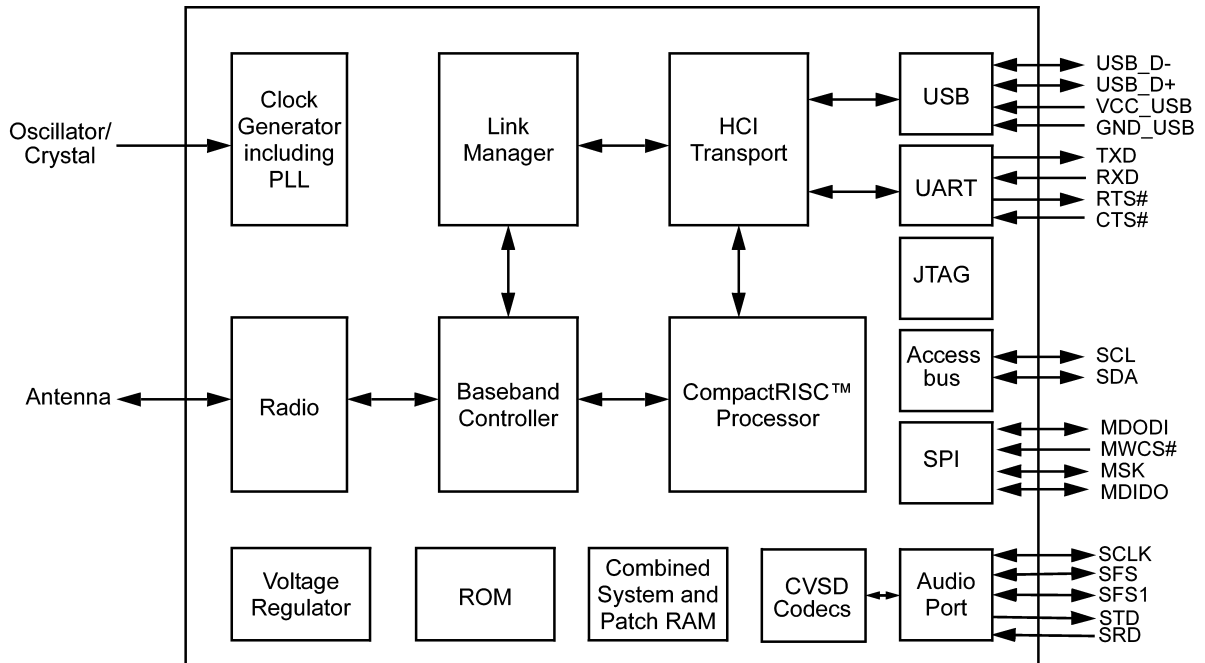
3.0 Features

- 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

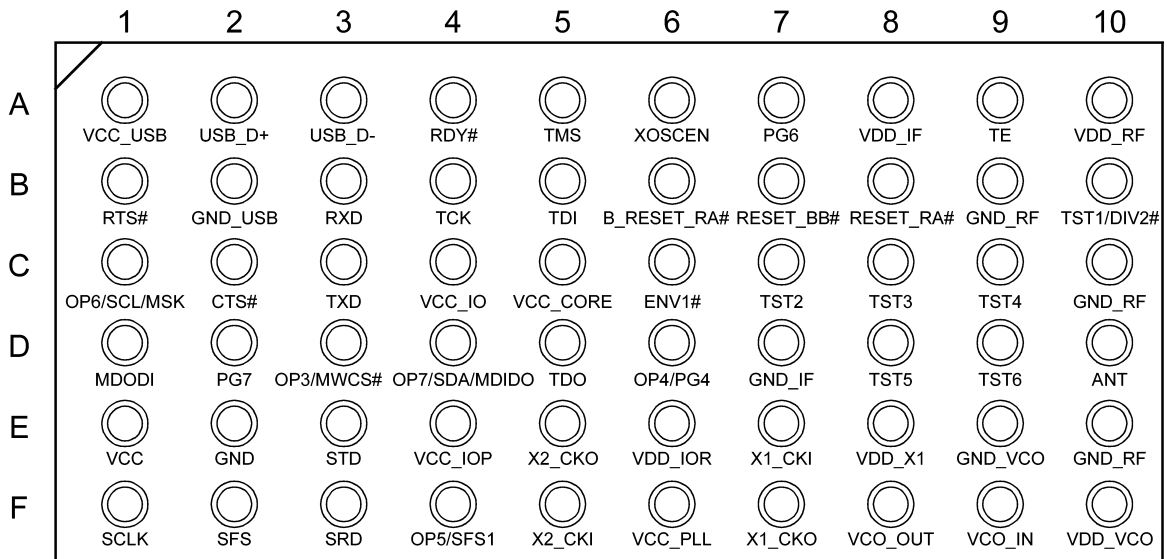
5.0 Functional Block Diagram



20180401

6.0 Connection Diagram

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



X-ray - Top View

20180402

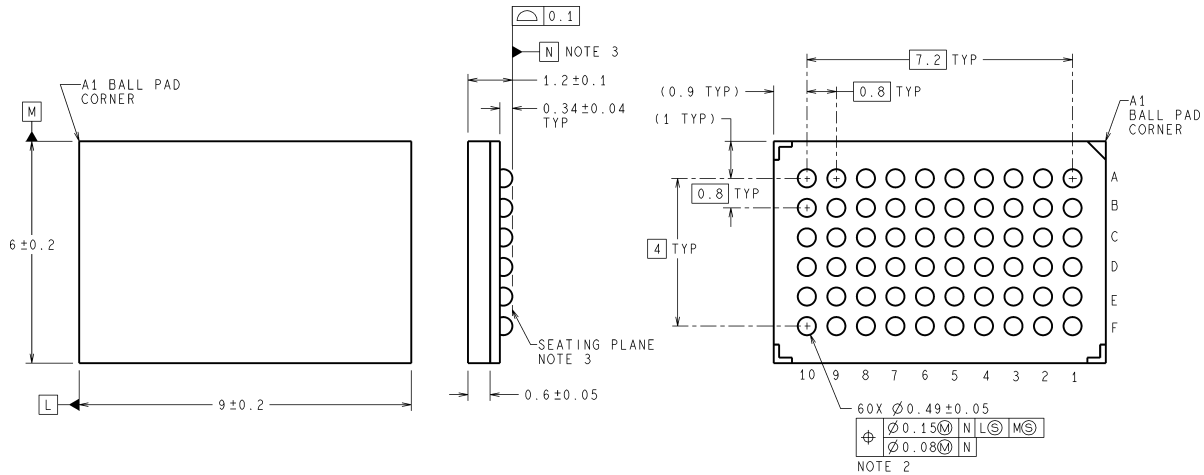
7.0 Ordering Information

| 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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2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

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