National Semiconductor

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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
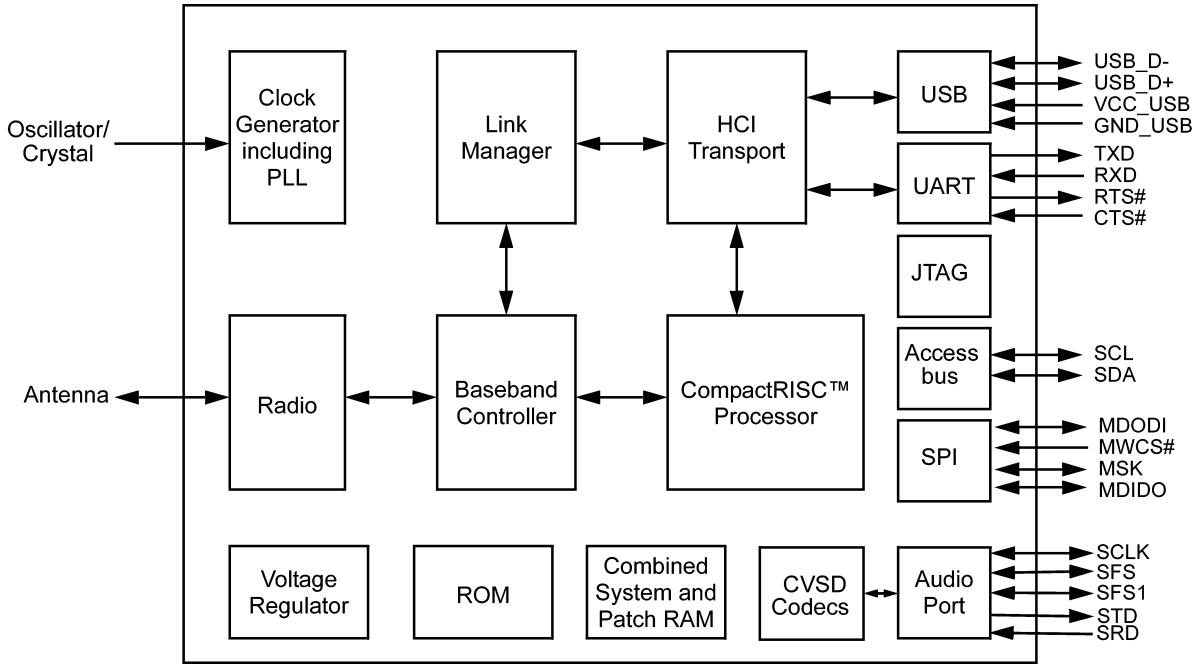• Personal Computers
• Automotive Telematics

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 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
■ 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
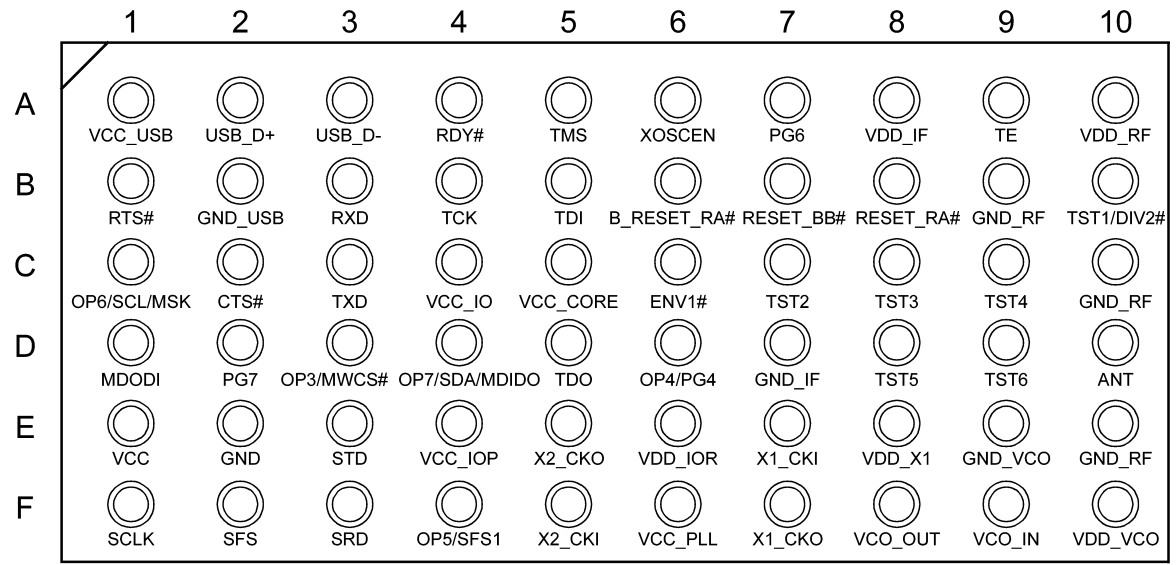■ Single Rx/Tx-pad radio interface

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MICROWIRE™ is a trademark of National Semiconductor Corporation.

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5.0 Functional Block Diagram

20180401

6.0 Connection Diagram

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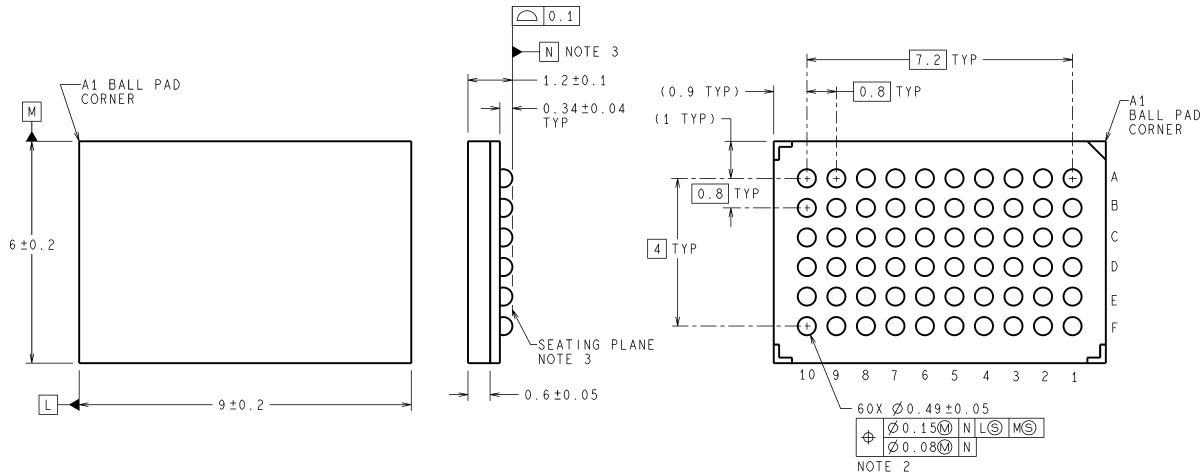

X-ray - Top View

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

DIMENSIONS ARE IN MILLIMETERS
DIMENSIONS IN ( ) FOR REFERENCE ONLY

SLF60A (Rev A)

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

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