



## Analog, Mixed Signal and Power Management

# MR2001–77 GHz Radar Transceiver Chipset

Our millimeter wave and radar products enable advanced, high-performance, multi channel systems for use in automotive radar, automotive advanced driver assistance systems (ADAS), automotive safety systems and other high-performance communication infrastructure and industrial systems.

### TARGET APPLICATIONS

- ▶ LRR, MRR and SRR
- ▶ ADAS
- ▶ Industrial surveillance and security systems
- ▶ Millimeter wave backhaul systems
- ▶ Data Fusion

The MR2001 is a high-performance 77 GHz radar transceiver chipset scalable for multi-channel operation enabling a single radar platform with electronic beam steering and wide field of view to support long-range radar (LRR), mid-range radar (MRR) and short-range radar (SRR) applications. This new radar chipset consists of a VCO (MR2001VC), a two-channel Tx transmitter (MR2001TX) and a three-channel Rx receiver (MR2001RX). This 77 GHz radar transceiver chipset is compatible with all leading MCUs, including the MPC577xK MCU.

The MR2001 radar chipset is designed to support fast modulation with simultaneous active channels, enabling excellent spatial resolution and detection accuracy across a wide field of view. It supports a large variety of chirps in open loop VCO radar system architectures and consumes minimal power. An integrated BB filter and VGA saves on the total BOM. The MR2001 radar chipset uses advanced packaging

technology to ensure the highest performance and minimum signal interference on the printed circuit board (PCB).

### RADAR-BASED SAFETY SYSTEMS

We provide a total system solution with next-generation embedded radar-based products that include the MPC577xK MCU and 77 GHz packaged radar front-end chipset for both low- and high-end radar modules. This pairing delivers a complete embedded radar system for automotive designs. Our total solution advances automotive safety by enabling vehicles to sense potential crash situations. This radar solution provides long- and mid-range functionality, allowing automotive systems to monitor the environment around the vehicle to help prevent crashes.

A typical radar module consists of a transmit solution (Tx), VCO and three-channel receiver IC (Rx), along with an MCU. The chips are connected via the local oscillator signal, around 38 GHz. The individual control of each chip is implemented by a serial peripheral interface (SPI) bus. The main controller



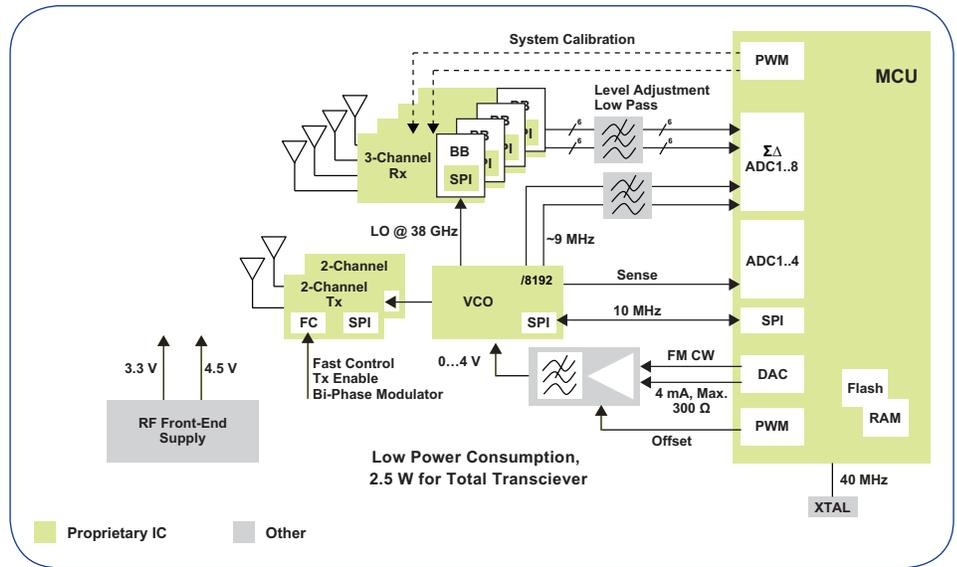


and modulation master is a single MCU with integrated high-speed analog-to-digital converters (ADCs) and appropriate signal processing capability, such as fast Fourier transforms (FFTs).

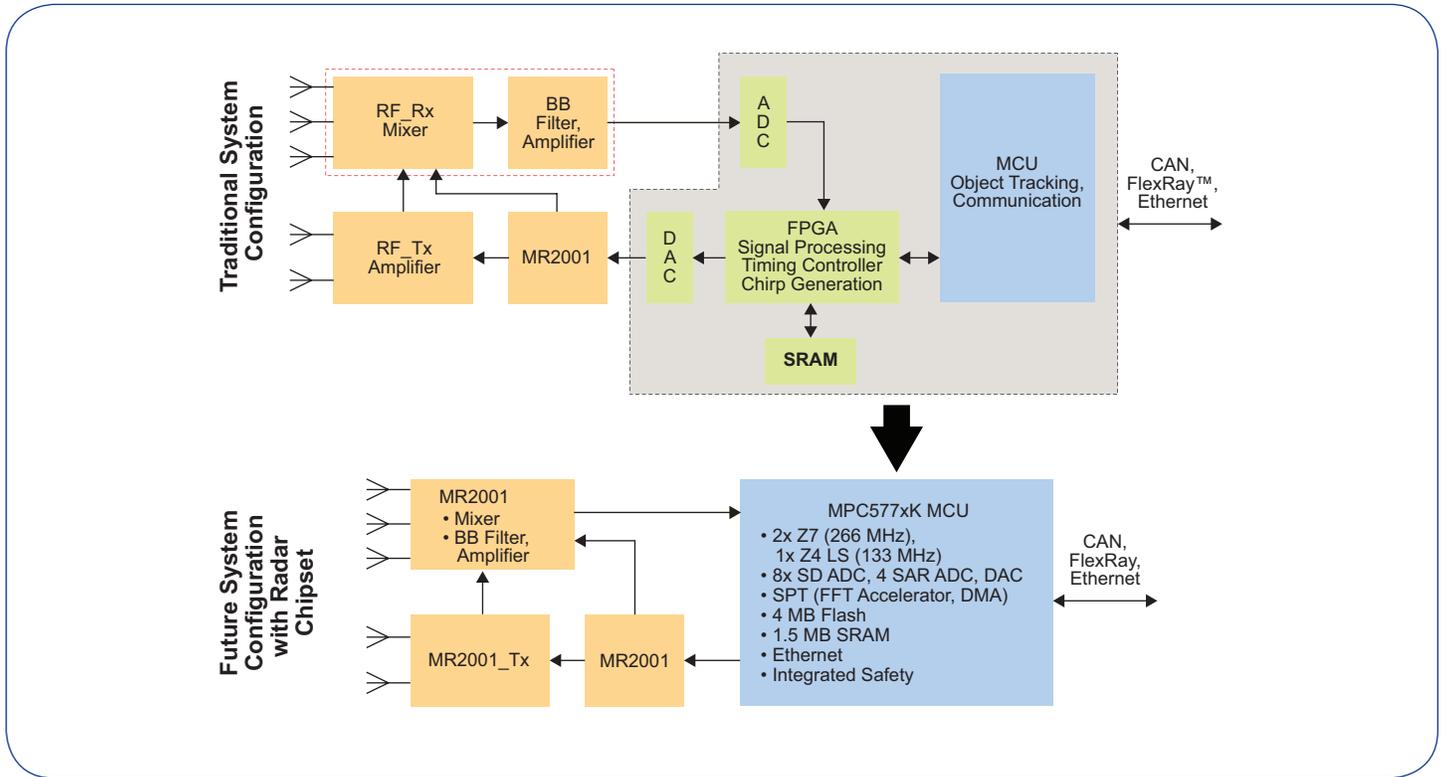
### ANALOG SOLUTIONS

Expanding on more than 30 years of innovation, our company is a leading provider of high-performance products that use silicon germanium (SiGe) and SMARTMOS technology combining digital, power and standard analog functions. We supply analog and power management ICs that are advancing the automotive, consumer, industrial and networking markets. Analog solutions interface with real-world signals to control and drive for complete embedded systems.

### SIMPLIFIED APPLICATION DRAWING



### RADAR CHIPSET EVOLUTION





## MR2001 77 GHz RADAR CHIPSET DIFFERENTIATION

Features	Benefits
Scalable to Four Tx and 12 Rx Channels	Enables single radar platform with electronic beam steering over wide field of view, supporting LRR, MRR and SRR applications for budget to luxury vehicles
Integrated Rx BB Filter and VGA	Saves system BOM cost
Optimized for Radar Processor MPC577xK	Receiver path optimization with MPC577xK, including unique built-in system test features. Ensures the best receiver sensitivity required for excellent detection accuracy
Advanced Packaging Technology	Easiest to use, handle and manufacture for customers. Ensures highest performance and minimum signal interference on the customer PCB
Low Power Consumption of 2.5 W for the Total Transceiver. Best phase noise < -85 dBc/Hz at 100 kHz offset	Low power consumption saves energy and heat. Best phase noise enables precise discrimination of objects for automatic cruise control, blind spot detection, lane departure warning and pedestrian detection



### SAFEASSURE PROGRAM: FUNCTIONAL SAFETY. SIMPLIFIED.

The SafeAssure functional safety program is designed to help you simplify the process of achieving system compliance with functional safety standards in automotive and industrial markets. When combined with the MPC577xK MCU, the 77 GHz radar chipset allows validation of radar system performance through integrated self-test features requiring no additional external components.



[www.nxp.com/radar](http://www.nxp.com/radar)

© 2015 Freescale Semiconductor, Inc.

The Energy Efficient Solutions logo, SafeAssure and the SafeAssure logo are trademarks of Freescale Semiconductor, Inc., Reg. U.S. Pat. & Tm. Off. SMARTMOS is a trademark of Freescale Semiconductor, Inc. All other product or service names are the property of their respective owners.

Document Number:  
MR2001FS REV 4

