



MT3511 RF MicroDigitizer™ for Software Defined Radio

The MT3511 is a single-chip RF-to-Digital Converter (RDC) that integrates the functions of a high-end AM/FM silicon tuner with an analog-to-digital converter targeted for automotive software defined radio platforms.

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Description

The MT3511 is a RF-to-digital converter specifically designed for automotive infotainment systems. The integrated 16-bit analog to digital converter (ADC) digitizes the IF signal and provides a suitable interface for high-end software defined radio architectures. A generic processor (e.g. DSP) can be used to demodulate the supported radio standards.

The MT3511 features integrated RF LNAs as well as RF AGCs for AM and FM in order to ensure excellent sensitivity as well as state-of-the-art strong signal performance. The RF attenuation range can optionally be extended by adding external PIN diodes.

The integrated image reject mixer converts the RF signal to an intermediate frequency (IF) while the desired channel is isolated using an external ceramic filter. After adjusting the gain with the IF amplifier the analog IF signal is digitized using the on-chip 16-bit ADC, which provides a serial data output for software-demodulation on an external processor.

This serial data output does not only contain radio signal information but also provides tuner status information in order to optimize the external signal processing. The MT3511 additionally integrates a state machine for frequency tuning actions enabling inaudible checks of alternative frequencies (AF).

Due to its high level of integration, the MT3511 requires a minimum of external components. Complying with automotive requirements the MT3511 supports an extended temperature range of -40° to +85°C and is specifically designed for qualification according to the AEC-Q100 standard.

Applications

- High-end automotive infotainment systems including multi-tuner applications (e.g. FM phase diversity)
- Receivers based on software-defined radio architectures

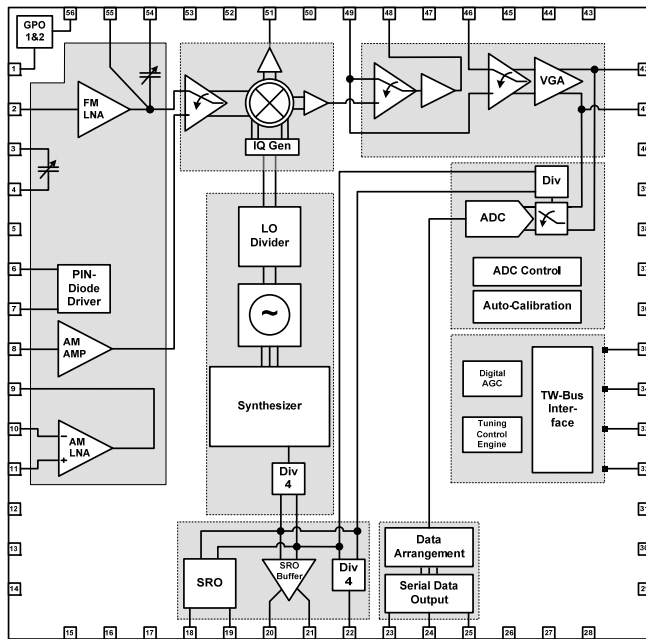
General Features

- Integrated ESD protection
- Compact 8x8 mm 56-pin QFN package with exposed paddle
- Compliant to RoHS and GADSL
- Supports extended temperature range of -40° to +85°C
- Designed for qualification according to AEC-Q100 quality standard

Tuner Features

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| <ul style="list-style-type: none"> ▪ Supports AM, FM and weather band plus HD Radio Technology™ and DRM ▪ Integrated AM and FM LNA with programmable RF AGC ▪ Integrated two stages FM RF selectivity (off-chip coil required) ▪ Fully integrated Image Rejection Mixer ▪ Selectable high/low side injection of local oscillator ▪ Fully integrated low phase noise VCO with fractional-N PLL ▪ IF amplifier with AGC | <ul style="list-style-type: none"> ▪ IF filter switch to support up to two off-chip ceramic filters ▪ Digital AGC for internal gain control with programmable thresholds ▪ Support of external PIN-diodes for expanded AGC range ▪ Integrated 16-bit ADC with self calibration ▪ Serial data output ▪ Two-wire serial control interface ▪ Buffered reference frequency output for multi-tuner (diversity) applications ▪ Minimum external components |
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Block Diagram



Recommended Operating Conditions

Parameter	Min	Typ	Max	Unit
Supply voltage		5		V
Current consumption		250		mA
Current consumption, Standby		100		µA
Operating junction temperature			+125	°C
Storage temperature range	-50		+150	°C

Electrical Characteristics

Parameter	Min	Typ	Max	Unit
FM Characteristics				
Voltage gain		63		dB
Image Rejection		75		dB
IF rejection		85		dB
Input IP3		102		dBµV
Noise figure		8		dB
AM Characteristics				
Voltage gain		54		dB
Image rejection		65		dB
Input IP2		143		dBµV
IRN at LNA input		2		nV/Hz

Input / Output Characteristics

Parameter	Min	Typ	Max	Unit
Serial Two-wire Bus				
Logical voltage		3.3	5	V
Serial clock frequency			400	kHz
Analog to Digital Converter				
Resolution		16		bit
Output data rate		1.92		MS
IF center frequency		12		MHz
Frequency Range				
AM mode	0.1		26.1	MHz
FM mode	76		108	MHz
Weather band	161		163	MHz

Related Documents

- PB-00176 – MT3511 Product Brief (This document)
- DS-00120 – MT3511 Data Sheet
- AN-00204 – MT3511 Software API Manual

Contact and Ordering Information

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