

TONDELAYO™ 1 RADIO



A High-Performance RF/IF Silicon Solution

SYSTEMONIC'S TONDELAYO 1 RADIO IS A **DUAL-BAND FRONT-END CHIPSET SOLUTION** COMPRISED OF THE SRF1001 **RADIO FREQUENCY** AND THE SIF1001 **INTERMEDIATE FREQUENCY CHIPS**. THE TONDELAYO RADIO CHIPSET SUPPORTS ALL IEEE 802.11 AND HIPERLAN/2 FREQUENCY BANDS AT **2.4 GHZ AND 5 GHZ**.

Overview

The Tondelayo 1 Radio Chipset, based on Systemonic RFlex™ technology, uses a superheterodyne architecture to offer superior receiver sensitivity and frequency selectivity over other competing architectures. This architecture was also chosen because of its ability to meet the stringent linearity requirements of the 64-QAM, OFDM waveform. Unlike competing architectures, superheterodyne architectures are less susceptible to LO leakage and Tondelayo's IF sampling is immune to the I/Q mismatches inherent in other approaches.

The SRF1001 is a highly integrated, low cost up/down-converter module designed to operate in the 5.15-5.35 and 5.725-5.825 GHz UNII bands and 2.4-2.5 GHz ISM bands. The SIF1001 is a highly integrated, low-cost IF converter, amplifier, and programmable attenuator module designed to work in conjunction with the SRF1001. The modules utilize the latest silicon germanium technology for optimum RF performance, efficiency, and low-cost. The modules are packaged in flip-chip assembly to give good RF performance and save valuable PWB space.

The Tondelayo Radio receive path has several stages of programmable attenuation that protect the front end LNA from going into saturation in the presence of large incoming signals, and preserves the linearity required to receive OFDM signals. This is a key advantage when the mobile unit is close to the base station or access point.

The Tondelayo Radio chipset is designed in SiGe BiCMOS, which offers high levels of integration, performance and wide band operation. SiGe has superior low-noise figures, phase characteristics and higher operating frequency than RF CMOS. This results in improved performance in detecting lower level signals, improved linearity and lower phase noise.

The Tondelayo Radio chipset employs on-chip impedance matching, which allows system designers to use it in their designs without having to concern themselves with complex reactive networks that add parts count and take up valuable board real estate.

The Tondelayo Radio chipset employs on-chip impedance matching, which allows system designers to use it in their designs without having to concern themselves with complex reactive networks that add parts count and take up valuable board real estate.

Benefits

- : Support for both 2.4 GHz and 5 GHz frequency bands is accomplished using the same RF/IF chipset.
- : Low-risk, flexible architecture keeps frequency synthesis off-chip.
- : Receive gain split between RF and IF chips minimizes layout and oscillation problems.
- : Gains of RF and IF chips account for transmit filter and SAW filter losses.

- : Input and output impedances are matched on chip for easy integration with filters, ADC's, and DACs.
- : Dynamically controllable receive gain maximizes carrier-to-noise ratio and prevents components from being driven into saturation.
- : Active mixers provide gain to amplify the signal before final transmit stage, thus help to minimize the requirement on external power amplifier.
- : Advanced SiGe process offers improved linearity and lower phase noise, which contribute to longer range.

W-LAN multi-protocol baseband integrated circuits silicon solutions W-WAN multi-mode radio

Features

- : Operates in the IEEE 802.11 and HiperLAN/2 frequency bands at 2.4-2.48 GHz and 5.15-5.825 GHz.
- : Low-noise figure 5 GHz LNA integrated in the RF chip.
- : SiGe Process provides required phase noise and linearity to handle 64-QAM signals.
- : Single 465 MHz IF SAW filter for transmit and receive paths.
- : Gilbert cell mixers with active gain.
- : 50 dB of receive attenuation.
- : 50 Ohm matched RF ports.
- : 200 Ohm matched IF ports—differential signals for better common mode noise rejection.
- : Single-ended baseband ports for connection to typical A/D and D/A.
- : Power down of unused transmit or receive stages by T/R signal.
- : Single supply operation.
- : Low-cost, space saving flip-chip package.

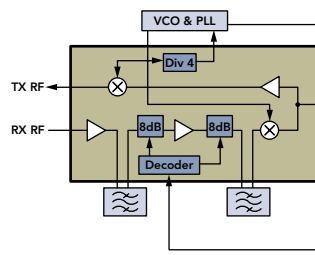
Applications

- : 5 GHz and 2.4 GHz multi-protocol W-LAN Interface Cards and Access Points.
- : Enterprise Wireless LAN systems.
- : PDAs, Notebook Computers.
- : 802.11a+b CardBus wireless transceiver.
- : Protocol-configurable W-LAN Access Points and Bridges for "hot-spots" or public-area Wireless LANs.
- : Wireless Home Networking systems.
- : Consumer electronic devices for Wireless Digital, Audio, Video, Multimedia and Telephony.
- : Routers, cable modems, and television set-top boxes with wireless LAN capability.
- : Proprietary fixed-wireless protocols, point-to-point radios.

SPECIFICATIONS

Process Technology	0.35µm SiGe
Evaluation Platform	Stand-alone card
Reference Design	Dual-band PC Card form factor with sample Windows driver and configuration utility
Frequency Band	2.4-2.48 GHz and 5.15-5.825 GHz
Supply Voltage	3.0 V
TX Output Power Level	Average: -12.5 dBm P1dB: -2 dBm Typical
5 GHz LNA	4 dB Noise Figure and 28 dB gain
Packaging	24 pin, Low Temperature Co-fired Ceramic (LTCC)
Packaging Dimensions	8mm x 8mm
Attenuation/Gain	SRF1001: Two 8 dB attenuator blocks SIF1001: Two blocks adding up to 34 dB attenuation
IF Frequency	465 MHz
Baseband Interface	60 MHz IF
Receive Sensitivity	3 dB better than specification for all data rates
Power Consumption	SRF1001: 693 mW (Rx), 585 mW (Tx), 36 mW (sleep mode) SIF1001: 489 mW (Rx), 258 mW (Tx), 36 mW (sleep mode)

SRF1001 BLOCK DIAGRAM



SIF1001 BLOCK DIAGRAM

