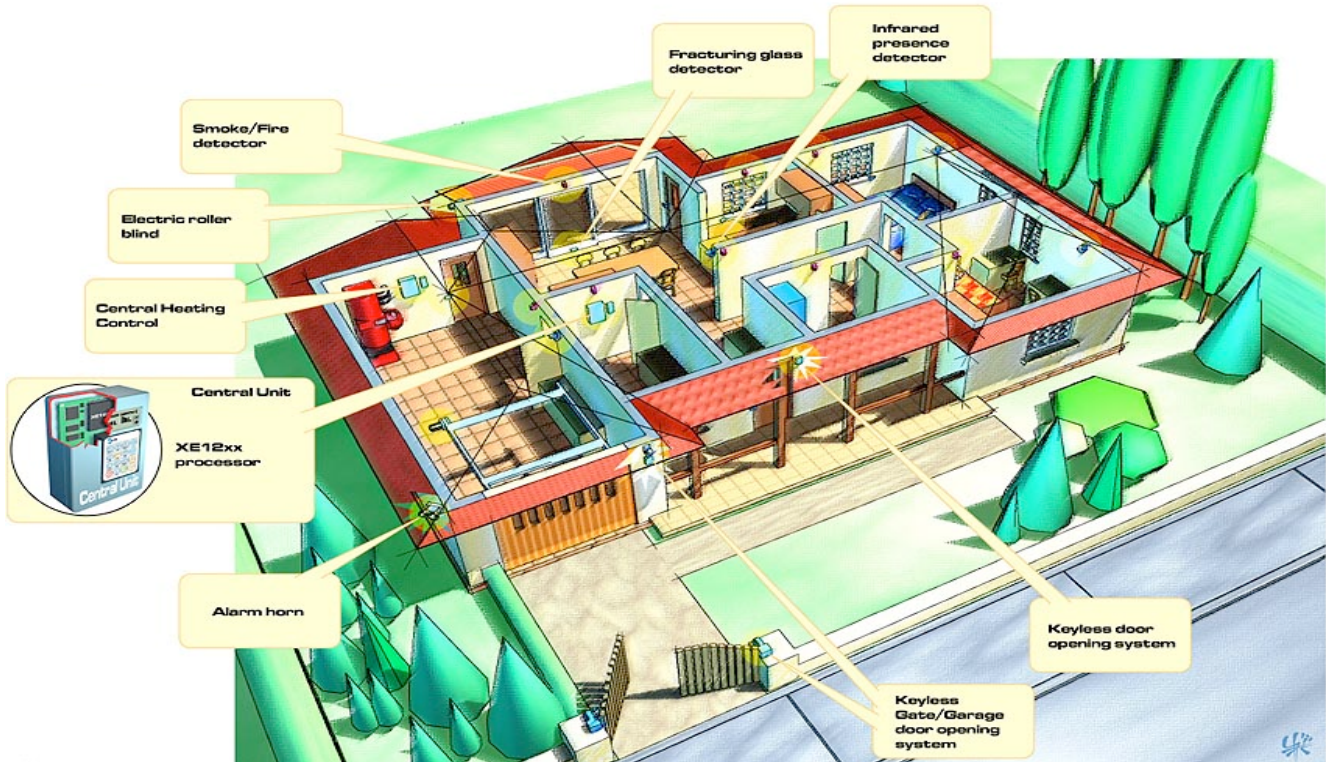




XEMICS

Product Brief XE1200 series
Ultra low power transceivers
from 30 kHz to 915MHz



XE1200 series

Ultra low power transceivers from 30 kHz to 915MHz

General Description

The XE1200 series is a family of short range data transceivers for use in battery powered applications. All members of the XE1200 series are single chip transceivers allowing for data transmission and data reception in half duplex mode. The XE1200 series is designed in optimized CMOS and BiCMOS technologies, enabling the best possible power consumption as well as RF performance.

Applications

- Short range data communications
- Home automation
- Alarm systems
- Utility metering
- Wireless remote control
- Wireless tracking systems
- Wireless automotive applications
- Voice over RF transmission

Key Product Features

- 30kHz to 915MHz
- Low voltage operation from 2.0V* to 5.5V
- Ultra low power consumption
- High RF output power
- High RF reception sensitivity
- Continuous Phase FSK modulation
- Built-in data bit synchronizer
- Highly integrated RF systems (optimized system cost, few external components required)
- Direct conversion architecture (Zero IF)
- High transmission data rate: up to 153.2kb/s* *

* XE1209 ** XE1203

Ordering information

Products Ref.	Frequency range	Package
XE1209	30-70kHz	SOP20
XE1201A	300-500MHz	TQFP32
XE1202	433-868-915MHz	LQFP44
XE1203	433-868-915MHz	VQFN48

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XE1200 series main features:

Zero-IF architecture:

The XE1200 series of transceivers are all based on the direct conversion (Zero-IF) architecture. Image rejection filters as well as subsequent IF filters are not required to operate RF front ends based on the XE1200 series. This reduces the over all system-level design complexity. The XE1200 series' direct conversion architecture requires few external components, so smaller system form-factors are possible at lower system cost. The modulation used on all XE1200 transceivers is the continuous phase Frequency Shift Keying (FSK).

Fully synchronous received data:

The XE1200 series includes a "Bit Synchronizer" function that allows for fully synchronized data reception at high throughput rate. The Bit Synchronizer recovers the data clock and makes it available on a separate pin on the transceiver. With the Bit Synchronizer, the complete available data throughput of each transceiver can be utilized for payload: encoding protocols such as NRZ, Manchester and Bi-phase are not required for reliable data transmission.

Narrow band, wide band, high data rate:

The XE1200 series features on-chip channel filtering. Depending on frequency band, several on-chip filters are available thus enabling the designer to dynamically select between wide band or narrow band, allowing data rates up to 153.2kbps*. The various channel filters are software selectable, and no external component modifications are required.

* Using the XE1203

		XEMICS TRANSCEIVERS			
		XE1209	XE1201A	XE1202	XE1203
Frequency (MHz)		30-70kHz	300-500MHz	433-868-915MHz	433-868-915MHz
Modulation		2-FSK	2-FSK	2-FSK	2-FSK
Supply voltage	Min	2.0V	2.4V	2.4V	2.4V
	Max	3.2V	5.5V	3.6V	3.6V
Typ. current	RX	200µA*	6mA	14mA	14mA
	TX	1.8mA	13.5mA@+5dBm	33mA@+5dBm	33mA@+5dBm
Output power		*	-15 / -5 / 0 / + 5dBm	0 / +5 / +10 / +15 dBm	0 / +5 / +10 / +15 dBm
RX sensitivity 0.1% BER (@channel BW)		*	- 109dBm@300kHz	- 113dBm@10kHz	- 113dBm@100kHz
Max. Data rate		1.82kb/s	64kb/s	76.8kb/s	153.2kb/s
Frequency synthesizer		Internal PLL	Single channel	Multi-channel PLL	Multi-channel PLL
Bit synchronizer		Yes	Yes	Yes	Yes
Crystal oscillator		32kHz	4MHz	39MHz	39MHz
Package		SOP20	TQFP32	LQFP44	VQFN48
Availability		Volume	Volume	Volume	Volume

* Broadcasting range 2-3 meters

XE1209: 30 kHz - 70 kHz CMOS transceiver

The XE1209 ultra low power transceiver operates in the worldwide available license free long wave frequency band. The XE1209 is ideally suited for very short-range data transmission (up to 3 meters) with average power consumption in TX mode of only 1.8mA. The XE1209 includes a built-in carrier detector that on presence of an incoming signal can wake up the complete communication system. An RF front-end system can be designed with the XE1209 and fewer than 10 external components, including a low cost 32 kHz crystal oscillator. Various types of standard LW ferrite antennae are available to interface with the XE1209.

XE1201A: 300 - 500MHz BiCMOS Transceiver

The XE1201A is a single chip, half-duplex FSK transceiver for operations in the European and Asian 433MHz as well as the USA 315MHz ISM bands. The XE1201A includes one on-chip filter allowing for a 300 kHz wide channel with a programmable deviation frequency of 4 kHz to 200 kHz (minimum steps of 5 kHz). Reference designs are available based on the XE1201A using a single frequency local oscillator (LO) based on a SAW resonator or the possibility for channelized operation via an external synthesizer.

The XE1201A has a built in programmable RF output power amplifier with 4 different levels (ranging from -15dBm to +5dBm) allowing for optimized power consumption at all times. The XE1201A seamlessly interfaces to most microcontrollers and is ideally suited for fully synchronized data transfer at up to 64kbps.

XE1202: 433-868-915MHz BiCMOS transceiver

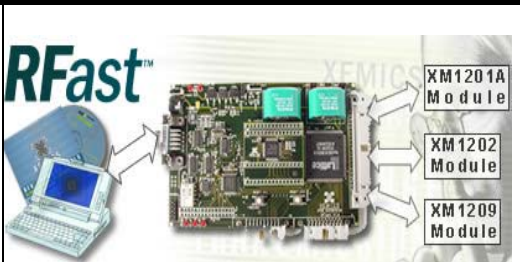


The XE1202 is a single chip transceiver aimed at the European 868-870MHz, Asian/European 433MHz and the US 902-928MHz ISM bands. The XE1202 includes 4 on-chip channel filters (10 kHz, 20 kHz, 40 kHz, 200 kHz) allowing SSB dynamically selectable narrow or wide band operation. The XE1202 also features a programmable frequency synthesizer (steps of 500Hz) ideally suited for frequency hopping applications. The XE1202 includes features such as RSSI (Received Signal Strength Indicator) and FEI (Frequency Error Indicator) enabling optimized power consumption and reliable communication.

The RF output power of the XE1202 can be dynamically modified. Four levels ranging from 0dBm to +15dBm are available, and with a receive sensitivity of -113dBm (at 4.8 kbps data rate, 5kHz frequency deviation, 0.1% BER) the XE1202 link budget in excess of 128 dB allows a range of over 4 km line-of-sight. The XE1202 seamlessly interfaces to most microcontrollers via a serial interface.

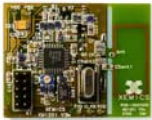




XE1203: 433-868-915MHz BiCMOS transceiver

The XE1203 is a single chip transceiver aimed at the European 868-870MHz, Asian/European 433MHz and the US 902-928MHz ISM bands. Dedicated for wide band application, the XE1203 includes 2 on-chip channel filters (100 kHz, 300 kHz) SSB. The XE1203 includes Barker encoder/decoder hardware which can be activated to encode/decode the transmitted signal to reduce the fixed frequency in-band interference. The XE1203 includes features such as RSSI, FEI and pattern detector enabling optimized power consumption and reliable communication. A Konnex-compliant mode (fixed data rate of 32.77 kbps) makes the XE1203 an ideal choice for Konnex RF links in European home automation applications.

The RF output power of the XE1203 can be dynamically modified. Four levels ranging from 0dBm to +15dBm are available, and with a receive sensitivity of -113dBm (at 4.8 kbps data rate, 55kHz frequency deviation, 0.1% BER) the XE1203 link budget in excess of 128 dB allows a range of over 4 km line-of-sight. The XE1203 seamlessly interfaces to most microcontrollers via a serial interface.

Development Tools		
XE1200GIB	With the XE1200GIB (General Interface Board) one can interface all of XEMICS' radio transceiver devices to a PC. The GIB can perform simple tests on the XE1200 series transceivers as well as run complex communication protocols on its on-board microcontroller, for complete application validation. The GIB offers some application source code examples and enables wireless communication application development based on XEMICS' 8bit proprietary microcontroller: the CoolRISC.	
XE1202SK XE1203SK	The Starter Kits are simple development environments for the XEMICS XE1202 and XE1203 transceivers. The XE1202SK/XE1203SK kits allow the demonstration of a two way communication between two Radio boards, to perform practical "demonstration", "range" and "site survey" testing but also to evaluate the RF transceiver through a PC GUI application.	
XE1201QEK	The XE1201QEK (Quick Evaluation Kit) enables quick functional tests to be performed using the XM1201A XEMICS radio transceiver modules. The XE1201QEK is a hand-held device; battery powered, allowing functional demonstration and range testing.	

RF MODULE FAMILY PRODUCTS							
Product	Frequency band	Evaluation / Certification	RF output		Development Tools		
			SMA Connector	With Antenna	GIB	Starter Kit	SK Part number
XM1201A	433 MHz	Evaluation		√	√		
DP1201A	433 MHz	Non-ETSI	Solder connection				
XM1202-E868	869 MHz	Evaluation	√	√	√	√	XE1202SK-E868
XM1202-E915	915 MHz	Evaluation	√	√	√	√	XE1202SK-E915
XM1202-C433LSR	433 MHz	ETSI	√	√	√	√	XE1202SK-C433LSR
XM1202-C868LSR	869 MHz	ETSI	√	√	√	√	XE1202SK-C868LSR
XM1202-C915LSR	915 MHz	FCC	√	√	√	√	XE1202SK-C915LSR
XM1203-C868	869 MHz	ETSI	√	√	√	√	XE1203SK-C868
XM1203-C915	915 MHz	FCC	√	√	√	√	XE1203SK-C915
XM1209	32 kHz	Evaluation		√	√		

Modules	Description	Features	Image
XM1201A	The XM1201A is a complete radio module reference design based on XEMICS' XE1201A transceiver IC. The XM1201A includes all necessary components for a radio transmission. It has a single connector for interfacing to a microcontroller. The XM1201A is a good starting point for building a radio module, complete manufacturing data is available.	<ul style="list-style-type: none"> • 433MHz • 2.4 V – 3.6V • Single channel • Loop antenna • 10 pin connector • GIB 	
DP1201A	The DP1201A is an Ultra Compact Radio Transceiver Module intended to use in the 433MHz ISM band. The DP1201A's interface is a fully digital interface (8 lines). The module requires no RF knowledge to use . The DP1201A is the perfect module where small size, low cost, low power and time to market are the most important issues. Ideal for Toy and Game applications. This module is not ETSI certified and is intended for those countries where ETSI regulations do not apply.	<ul style="list-style-type: none"> • 433MHz • 2.4 V – 3.6V • Single channel • No RF knowledge required • Fully assembled • 20 x 20mm • Direct Digital Interface 	
XM1202	The XM1202 is a complete radio module based on XEMICS' XE1202 transceiver IC. Several versions are available to offer the highest flexibility (433 / 869 / 915). Certified modules for Europe (ETSI) or North America (FCC) are also available and can be deliver in high volume. The XM1201A and the XM1202 modules can serve as starting points to get an application validated without the need to build up an RF PCB first.	<ul style="list-style-type: none"> • 433 / 869 / 915MHz • 2.4 V – 3.6 V • Multi channels • SMA connector • 20 Pin connector • GIB / Starter Kit 	
XM1203	The XM1203 is a complete radio module based on XEMICS' XE1203 transceiver IC. Twof versions are available to offer the highest flexibility (869 / 915). Certified modules for the Europe (ETSI) or North America (FCC) are also available and can be delivered in high volume. The XM1202 modules can serve as starting point to get an application validated without the need to build up an RF PCB first.	<ul style="list-style-type: none"> • 869 / 915MHz • 2.4 V – 3.6 V • Multi channels • SMA connector • 20 Pin connector • GIB / Starter Kit 	
XM1209	The XM1209 is a complete radio module reference design based on XEMICS' XE1209 transceiver IC. It has a separate antenna board allowing for quick broadcasting range optimization by experimenting with different antennae types. The XM1209 allows for quick validation of a low frequency data transmission using the XE1209. The XM1209 has a direct interface connector to most microcontrollers, including XEMICS' 8bit CoolIRISC.	<ul style="list-style-type: none"> • 32 kHz • 2.0 V – 3.2V • 2 channels • Coil antenna • 10 Pins connector • GIB 	

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