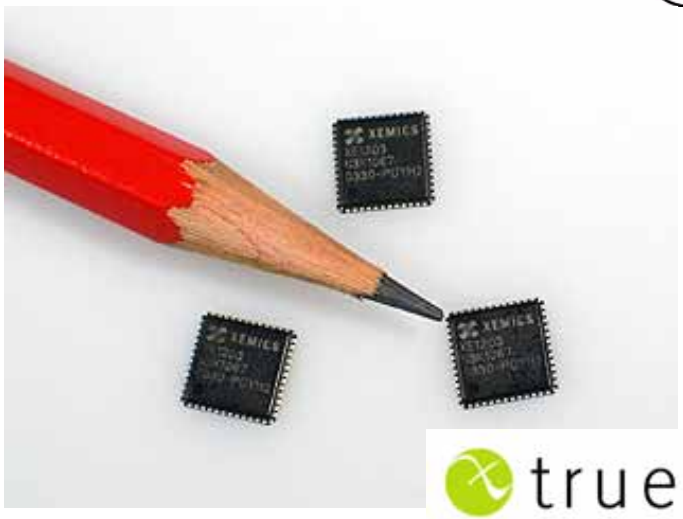
XEMICS

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



trueRF™

XE1200 Series Transceivers

Ultra low power transceivers from 30kHz 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
- Toys
- 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 153.2 kbit/s**
- Narrow band operation: 25 kHz channels for data rates up to 4.8 kbit/s***, NRZ coding.

* *XE1209* ** *XE1203 and XE1205* *** *XE1205*

Ordering information

Products Ref.	Frequency range	Package
XE1209	30-70kHz	SOP20
XE1201A	300-500MHz	TQFP32
XE1202	433-868-915MHz	LQFP44
XE1202A	433-868-915MHz	LQFP44
XE1203	433-868-915MHz	VQFN48
XE1205	433-868-915MHz	VQFN48

XE1200 series main features:

Zero-IF architecture:

The XE1200 series of transceivers are all based on the direct conversion (Zero-IF) architecture. Image 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; hence 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 153.2 kbit/s*. The various channel filters are software selectable, and no external component modifications are required.

** Only on the XE1203 and XE1205*

	XEMICS TRANSCEIVERS					
	XE1209	XE1201A	XE1202	XE1202A	XE1203	XE1205
Frequency (MHz)	30-70kHz	300-500MHz	433-868-915MHz	433-868-915MHz	433-868-915MHz	433-868-915MHz
Modulation	2-FSK	2-FSK	2-FSK	2-FSK	2-FSK	2-FSK
Supply voltage Min	2.0V	2.4V	2.4V	2.4V	2.4V	2.4V
Max	3.2V	5.5V	3.6V	3.6V	3.6V	3.6V
Typ. current RX	200µA*	6mA	14mA	14mA	14mA	14mA
TX	1.8mA	13.5mA@+5dBm	33mA@+5dBm	33mA@+5dBm	33mA@+5dBm	33mA@+5dBm
Output power	*	-15/-5/0/+ 5dBm	0/+5/+10/+15 dBm	0/+5/+10/+15 dBm	0/+5/+10/+15 dBm	0/+5/+10/+15 dBm
RX sensitivity (BER=0.1%) (@Bitrate)	*	- 109dBm@4.8kbs	- 113dBm@4.8kbs	- 113dBm@4.8kbs	- 113dBm@4.8kbs	- 116dBm@4.8kbs
Max Data rate	1.82kb/s	64kb/s	76.8kb/s	76.8kb/s	153.2kb/s	153.2kb/s
LO generated	PLL 2 frequencies	single channel	Yes, fractional N PLL step 500Hz	Yes, fractional N PLL step 500Hz	Yes, fractional N PLL step 500Hz	Yes, fractional N PLL step 500Hz
Bit synchronizer	Yes	Yes	Yes	Yes	Yes	Yes
Crystal oscillator	32kHz	4MHz	39MHz	39MHz	39MHz	39MHz
Package	SOP20	TQFP32	LQFP44	LQFP44	VQFN48	VQFN48
Availability	Volume	Volume	Volume	Volume	Volume	sample only

***** *Broadcasting range 2-3 meters*

XE1209: 30kHz - 70kHz 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 an average power consumption in TX mode of only 1.8 mA. 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 433 MHz as well as the USA 315 MHz 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 exist 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 –15 dBm to +5 dBm) allowing for optimized power consumption at all times. The XE1201A gluelessly interfaces to most microcontrollers and is ideally suited for up to 64kbps fully synchronized data transfer.

XE1202: 433-868-915MHz BiCMOS transceiver

The XE1202 is a single chip transceiver aimed at the European 868-870 MHz and the US 902-928 MHz ISM bands. The XE1202 includes four on-chip channel filters (10 kHz, 20 kHz, 40 kHz, 200 kHz) allowing dynamically selectable narrow or wide band operation. The XE1202 also features a programmable frequency synthesizer (steps of 500 Hz) ideally suited for frequency hopping applications. The XE1202 includes features such as RSSI 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 0 dBm to +15 dBm are available. The XE1202 seamlessly interfaces to most microcontrollers via a serial interface.

XE1202A: 433-868-915MHz BiCMOS transceiver

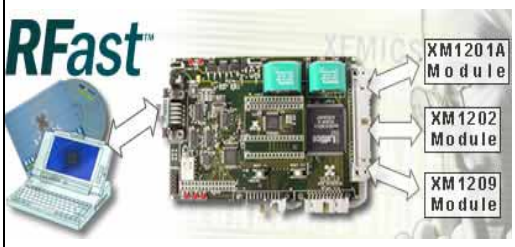
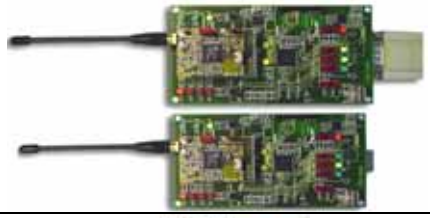
The XE1202A TrueRF™ transceiver offers comparable features to the XE1202, but with the additional benefit of TrueRF™ technology. Amongst the improvements offered by TrueRF™ are full FCC/ETSI compliancy without a SAW filter, additional register settings offering enhanced operation modes, and stability even when operating at 15dBm power output. No SAW filter also means improved transmitter efficiency, as no power is lost to the SAW filter.

XE1203: 433-868-915MHz BiCMOS transceiver

The XE1203 TrueRF™ is a single chip transceiver aimed at the European 868-870 MHz and the US 902-928 MHz ISM bands. Dedicated for wide band applications, the XE1203 includes two on-chip channel filters (200 kHz, 600 kHz). The XE1203 includes Barker encoder/decoder hardware which can be activated to modulate/demodulate the transmitted signal to reduce the fixed frequency in-band interference. The XE1203 includes features such as RSSI, FEI (Frequency Error Indicator), pattern detector enabling optimized power consumption and reliable communication. The RF output power of the XE1203 can be dynamically modified. Four levels ranging from 0 dBm to +15 dBm are available. The XE1203 gluelessly interfaces to most microcontrollers via a serial interface.

XE1205: 433-868-915MHz BiCMOS transceiver

The XE1205 TrueRF™ is a single chip transceiver aimed at the European 868-870 MHz and the US 902-928 MHz ISM bands. The circuit offers the unique advantage of both narrow-band and wide-band communication. The device is suitable for circuit applications which have to satisfy either the European (ETSI-300 220-1) or the North American (FCC part 15.231) regulatory standards. The XE1205 includes features such as 16 bytes FIFO for transmit and receive, data buffering and transfer via SPI bus, an optional transmitter-prefiltering to enable adjacent channel power below -37 dBm at 25 kHz, RSSI, FEI (Frequency Error Indicator), pattern detector enabling optimized power consumption and reliable communication. The RF output power of the XE1205 can be dynamically modified. Four levels ranging from 0dBm to +15 dBm are available. The XE1205 gluelessly interfaces to most microcontrollers via a 3-wire fully-compatible SPI serial bus.

Development Tools		
XE1200GIB	The XE1200GIB (General Interface Board) allows one to 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, this for complete application validation. The GIB offers some application source code examples and facilitates wireless communication application development based on XEMICS' 8bit proprietary microcontroller: the CoolRISC™.	
XE1202SK XE1203SK XE1205SK	The Starter Kit is an environment for the XE1202, XE1203 and XE1205 transceivers. TheXE1202SK / XE1203SK / XE1205SK enables demonstration of 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) will enable one to perform quick functional tests using the XM1201A radio transceiver modules. The XE1201QEK is a hand-held device; battery powered, facilitating functional demonstration and range testing.