



A New Direction in Mixed-Signal

Connectivity

UARTs & Bridges

USB

PCIe

PCI

I²C/SPI

8-bit

VLIO

Combo

Wireless

GPIO Expanders

Serial Transceivers

Multiprotocol

RS-485

RS-422

RS-232

2013

Print Edition

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Why Exar?

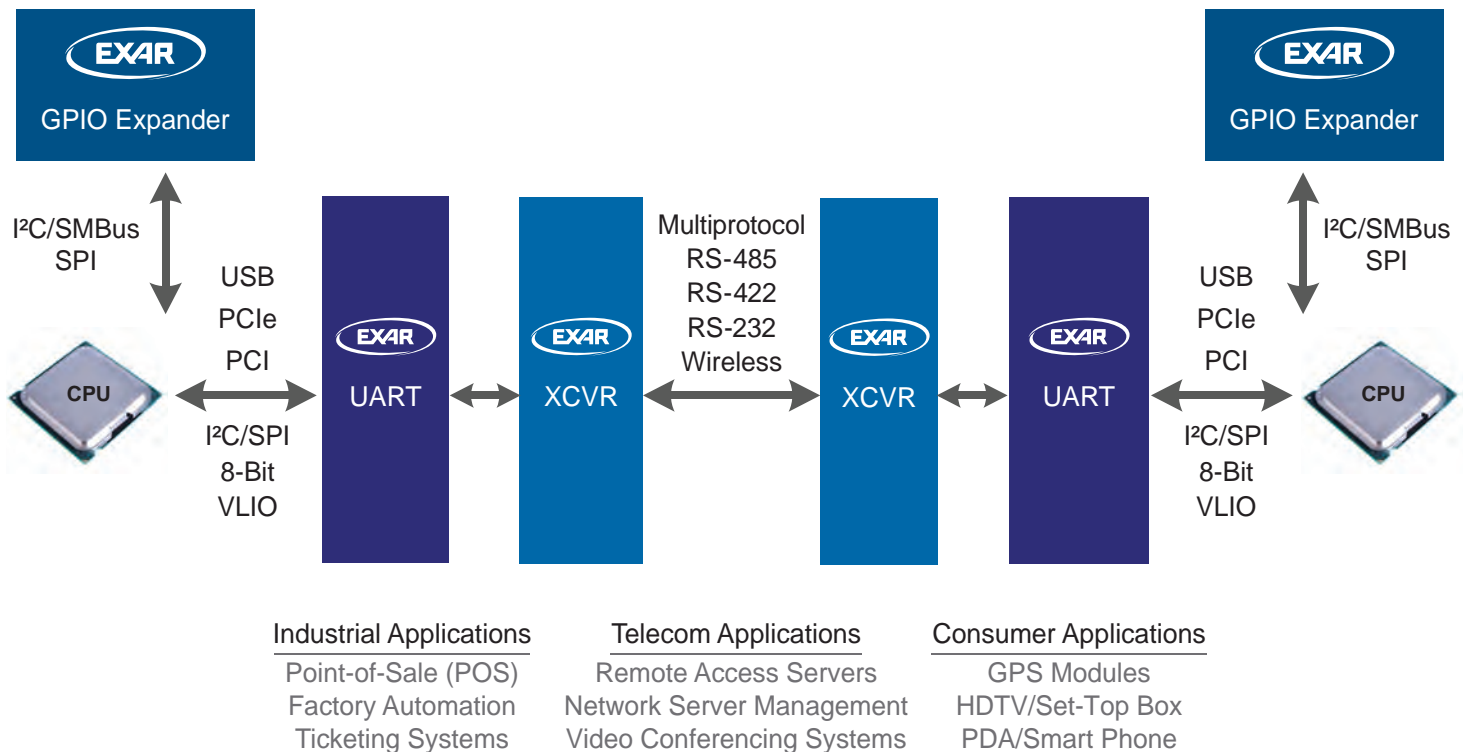
Top reasons for using Exar Connectivity Products:

1. Exar offers a broad synergistic portfolio of industry-leading UART, Serial Transceiver and Bridging solutions
2. Exar has the industry's fastest data rates and smallest package UARTs
3. Exar's serial transceiver and GPIO expander portfolios include pin compatible replacements and upgrades in industry standard pinouts
4. Exar provides software drivers, including source code, for most operating systems
5. Exar provides world-class technical support (typically within 24 hours)

uarttechsupport@exar.com and serialtechsupport@exar.com

Synergistic Connectivity Solutions

The simplest method to send data between two or more electronic devices is to use a UART and a serial transceiver. GPIO expanders are an easy way to increase the number of I/Os provided by the selected processor or add application specific functionality to embedded systems. Exar's Connectivity products have numerous applications across different market segments such as industrial, telecom, and consumer.



As the market leader in providing Universal Asynchronous Receiver and Transmitter (UART) solutions, Exar Corporation offers the broadest line of patented industry-proven product families. Exar's product line ranges from cost-effective industry-standard devices to high-performance multi-channel UARTs with a broad range of FIFO depths. Exar's stand-alone, off-the-shelf UART solutions reduce development time and provide an immediate competitive advantage in time-to-market and performance capabilities.

Legacy 8-bit UARTs provide parallel-to-serial or serial-to-parallel data conversion over industry standard asynchronous communication data interfaces such as RS-232, RS-422 and RS-485. In addition to the legacy 8-bit UARTs, Exar also offers I²C/SPI UARTs and conventional PCI UARTs. Recent innovative UART solutions from Exar include high-performance VLIO UARTs, USB UARTs and PCIe UARTs. Exar UARTs are found in consumer, industrial, telecommunication, embedded and numerous other applications.

Key Features and Technologies

Pin-to-Pin Migration Path

Exar offers a migration path from legacy UART devices to enhanced high-performance devices by maintaining pin-to-pin compatibility whenever possible. This minimizes hardware and software changes enabling a shorter time-to-market.

Software Compatibility with Previous Generation UARTs

In addition to a pin-to-pin migration path, Exar offers newer UARTs that are software compatible with previous generation UARTs, thus simplifying the software driver development. If changes to the software driver are necessary, in most cases, they are minimal. Software drivers and source code for various UARTs are available, royalty-free, from Exar.

Low Voltage Operation

Exar offers low voltage UART product families that are capable of operating down to 1.62V. The lower operating power supply range is well suited for battery operated systems and handheld devices.

Industry's Lowest Power Consumption

Exar's enhanced UARTs are low power devices. In addition, the devices feature Sleep and Power Save modes for further power saving as low as 5 μ A in Sleep mode.

Integrated Level Shifters

Exar offers USB UARTs, I²C/SPI UARTs and 8-bit UARTs with integrated level shifters. Absorbing the level shifter into the UART simplifies the hardware design for space-constrained designs and minimizes the BOM.

Fastest Data Rates

At 25Mbps, Exar offers the industry's fastest UARTs. In addition, slower/lower cost crystals and oscillators can be used to generate higher data rates with Exar's 8X and 4X sampling rate features.

Fractional Baud Rate Generator

Exar's Fractional Baud Rate Generator feature allows more flexibility for the designer in selecting a crystal or oscillator, since it can take any clock source to generate the standard legacy or custom baud rates.

Large FIFOs

Exar offers devices with 1 to 384 Bytes of FIFOs with programmable trigger levels and FIFO level counters. Larger FIFO sizes allow increased data throughput by loading and unloading more data per transaction. Larger FIFOs improve the performance by reducing the number of interrupts.

Independent TX/RX Baud Rate Generator

The baud rates of the TX and RX no longer have to be the same. This new feature in the XR16Mxxx single-channel UARTs allows different TX and RX baud rates so that the single channel UART can communicate with different UARTs at the same time.

Automatic Flow Control

Exar's enhanced UARTs offer auto RTS/CTS hardware and software flow control that prevent data loss, thus eliminating the need for re-transmission.

FIFO Level Counters

The FIFO level counter feature provides the exact number of bytes in the FIFO which improves the efficiency of loading data into the TX FIFO and unloading data out of the RX FIFO.

Programmable Trigger Levels

The Programmable Trigger Level provides the software the flexibility to optimize the TX and RX trigger levels for the best performance and throughput. UARTs without the programmable trigger level feature can only select from a few pre-defined trigger levels.

5V Tolerant Inputs

When the UART is operating at a supply voltage of less than 5V, the inputs can still withstand inputs up to 5V without increasing the power consumption or damaging the UART. This allows the UART to function seamlessly in a mixed voltage environment.

Multidrop Mode with Auto Address Detect

This feature simplifies both the hardware and software for 9-bit applications. The receiver will only receive data after an address match and will automatically ignore data if the address byte does not match.

Auto RS-485 Half-Duplex Direction Control with Programmable Turn-Around Delay

Exar was the first to introduce this unique feature to simplify the hardware and software design for half-duplex RS-485 systems.

Integrated Serial Transceivers

Exar offers UARTs with integrated RS-232 or RS-485 transceiver combos making it ideal for simplifying designs and using less board space in a single small footprint QFN package.

Serial Cable Replacement Wireless Solution

Exar's Wireless UART chipset consists of a Wireless UART controller and 900MHz RF Transceiver. With Exar's proprietary firmware, the Wireless UART chipset can be used as a serial cable replacement wireless solution.

Exar's USB UARTs are fully compliant to the USB 2.0 Full-Speed specifications and are listed on the USB-IF Integrator's List. At 12Mbps, Exar's USB UARTs are the industry's fastest USB UARTs.



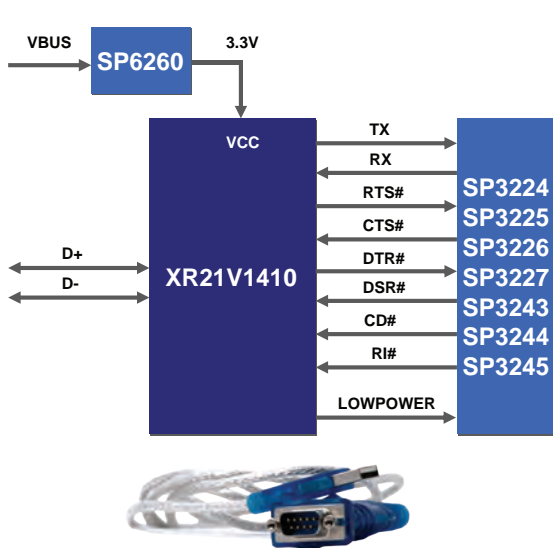
Software Drivers

The following software drivers for the USB UARTs are available from Exar: Windows 2000, XP, Vista, 7, CE 4.2, CE 5.0, CE 6.0, Linux 2.6.x, and Mac.

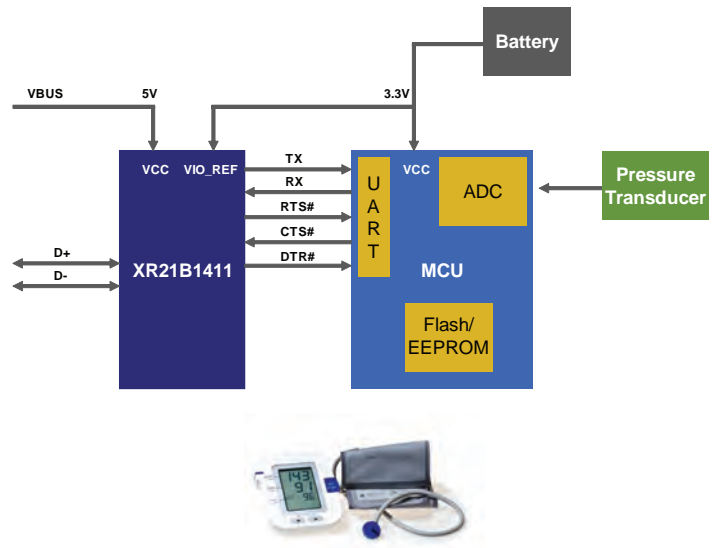
USB UARTs (3.3V)
 The XR21V141x is available in 1-ch, 2-ch and 4-ch versions. The XR21V141x is a 3.3V device with 5V tolerant inputs. The XR21V141x has an internal 48MHz clock. Custom Vendor IDs, Product IDs, USB attributes and maximum power consumption can be programmed via an external I²C EEPROM.

UART Device	Data Bus Interface	UART Ch.	Max Data Rate (Mbps)	TX/RX FIFO Bytes	Auto HW/SW Flow Control	Auto RS-485 Half-Duplex Control	Multidrop (9-bit) mode	Fractional Baud Rate Generator	Power Down Mode	5V Tolerant Inputs	Supply Voltage Range	Packages
XR21V1414	USB 2.0 FS	4	12	128 / 384	✓	✓	✓	✓	✓	✓	2.97V-3.63V	TQFP-48
XR21V1412	USB 2.0 FS	2	12	128 / 384	✓	✓	✓	✓	✓	✓	2.97V-3.63V	QFN-32
XR21V1410	USB 2.0 FS	1	12	128 / 384	✓	✓	✓	✓	✓	✓	2.97V-3.63V	QFN-16

USB UART Dongle Example



USB UART in Blood Pressure Monitor



USB UARTs (5V)

The XR21B1411 is a 1-ch USB UART that can be powered directly from the 5V supply voltage from VBUS. The XR21B1411 has a programmable internal 6MHz – 48MHz clock. Custom Vendor IDs and Product IDs can be programmed via the internal OTP, therefore eliminating the requirement for an external EEPROM. In addition, the XR21B1411 has a voltage reference pin to adjust the I/O levels of the UART/GPIO signals which can greatly extend the battery life of portable applications.

UART Device	Data Bus Interface	UART Ch.	Max Data Rate (Mbps)	TX/RX FIFO Bytes	Auto HW/SW Flow Control	Auto RS-485 Half-Duplex Control	Multidrop (9-bit) mode	Fractional Baud Rate Generator	Power Down Mode	Integrated Level Shifters	Supply Voltage Range	Packages
XR21B1411	USB 2.0 FS	1	12	128 / 384	✓	✓	✓	✓	✓	✓	4.5V-5.5V	QFN-16

Exar's PCIe UARTs (XR17V35x) are x1 PCIe endpoints that are compliant with the PCIe 2.0 Gen 1 (2.5Gbps) specifications. At 25Mbps, the PCIe UARTs are the industry's fastest UARTs. The PCIe UARTs have large 256 byte TX/RX FIFOs, 16 multi-purpose I/Os and support multidrop (9-bit) mode.

The XR17V35x is available in 2-ch, 4-ch and 8-ch versions. Like the PCI UART product family, the 4-ch and 8-ch versions of the PCIe UARTs are available in the same package and are pin compatible. In addition, the 4-ch and 8-ch PCIe UARTs have an expansion interface that will allow a single PCB design to support 4, 8, 12 or 16 UART channels.

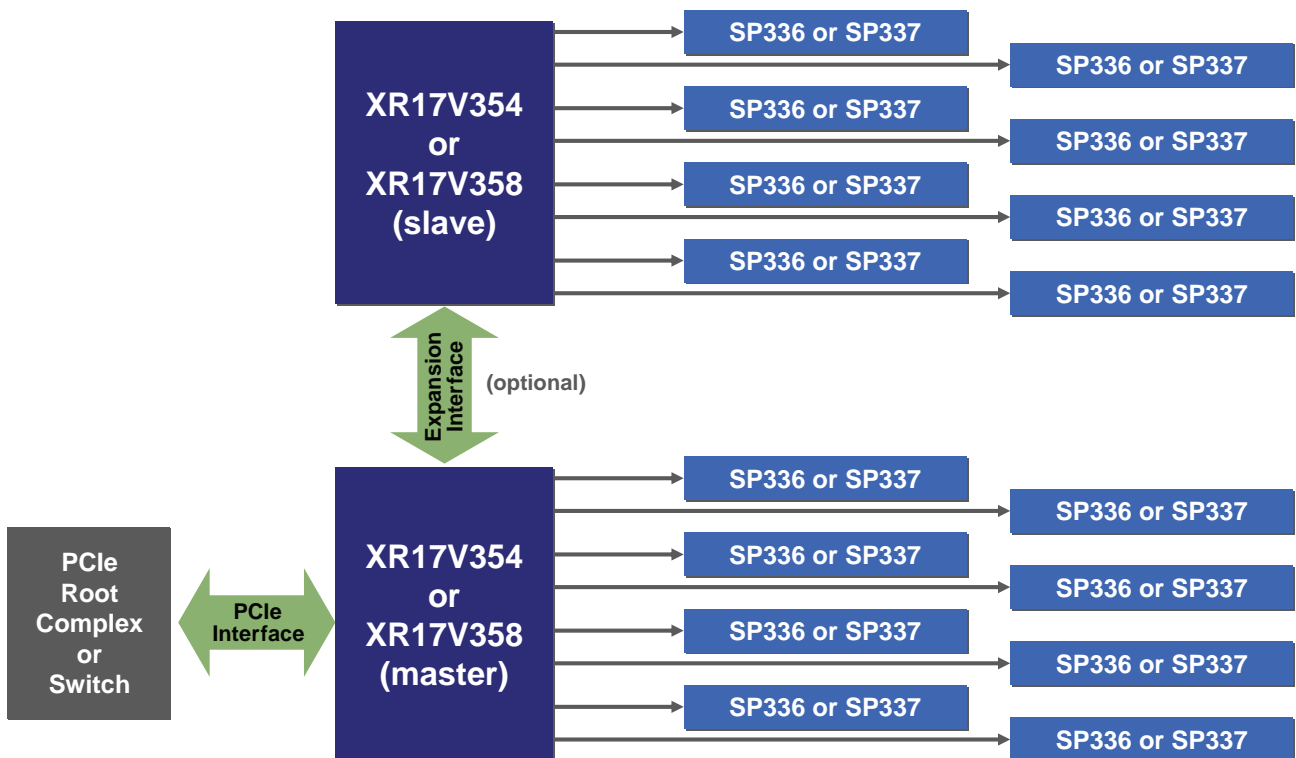
Software Drivers

The PCIe UARTs are software compatible with the PCI UARTs. The following software drivers for the PCIe UARTs are available from Exar: Windows 2000, XP, Vista, 7, CE 4.2, CE 5.0, CE 6.0, VxWorks 5.5, Linux 2.4.x, Linux 2.6.x and QNX 4.25.



PCIe UARTs																
UART Device	Data Bus Interface	UART Ch.	Max Data Rate (Mbps)	TX/RX FIFO Bytes	TX & RX FIFO Level Counters	Program. Trigger Levels	Auto HW/ SW Flow Control	Auto RS-485 Half-Duplex Control	Multidrop (9-bit) mode	Fractional Baud Rate Generator	Power Down Mode	5V Tolerant Inputs	Supply Voltage Range	No. of GPIOs	Packages	
XR17V358	PCIe 2.0 (2.5Gbps)	8	25	256 / 256	✓	✓	✓	✓	✓	✓	✓	✓	3.0V-3.6V	16	FPBGA-176	
XR17V354	PCIe 2.0 (2.5Gbps)	4	25	256 / 256	✓	✓	✓	✓	✓	✓	✓	✓	3.0V-3.6V	16	FPBGA-176	
XR17V352	PCIe 2.0 (2.5Gbps)	2	25	256 / 256	✓	✓	✓	✓	✓	✓	✓	✓	3.0V-3.6V	16	FPBGA-113	

RS-485 Example in Industrial Controls



Exar has the largest PCI UART family in the industry offering 33MHz and 66MHz PCI UARTs. The 33MHz PCI UARTs consist of the XR17C15x which are 5V PCI UARTs and the XR17D15x which are Universal (3.3V or 5V) PCI UARTs. The 66MHz PCI UARTs are the XR17V25x. Exar is the only UART vendor in the industry to have a 66MHz PCI UART. All Exar PCI UARTs have passed PCI compliance and are listed on the PCI-SIG Integrator's List.

The XR17C15x, XR17D15x and XR17V25x are all available in 2-ch, 4-ch and 8-ch versions. The 4-ch and 8-ch devices are available in the LQFP-144 package and are pin compatible. Therefore, customers can design the same board for both a 4-ch and 8-ch design, depending on their requirements. There are 8 multi-purpose I/Os on the PCI UARTs.

Software Drivers

The following software drivers for the PCI UARTs are available from Exar: Windows NT 4.0, 2000, XP, Vista, 7, CE 4.2, CE 5.0, CE 6.0, VxWorks 5.5, Linux 2.4.x, Linux 2.6.x, and QNX 4.25.

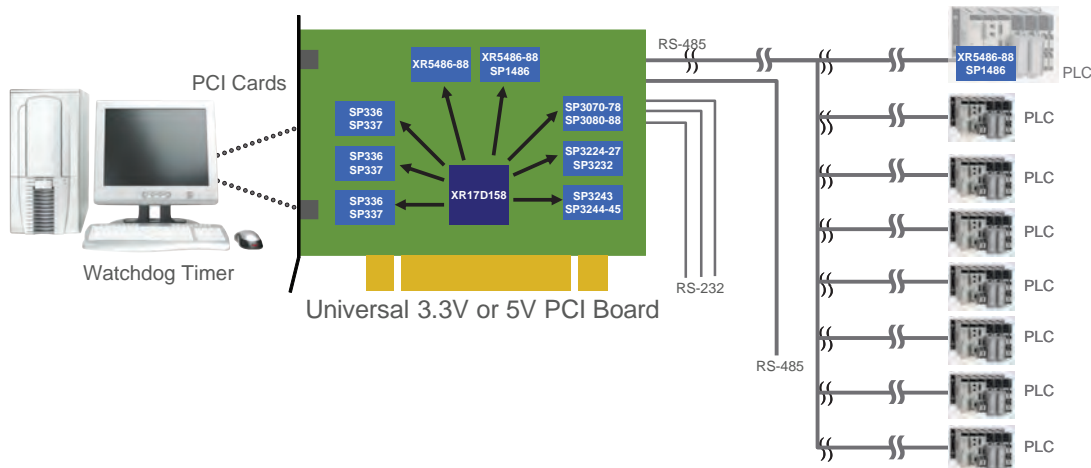


PCI UARTs (66MHz)														
UART Device	Data Bus Interface	UART Ch.	Max Data Rate (Mbps)	TX/RX FIFO Bytes	TX & RX FIFO Level Counters	Program. Trigger Levels	Auto HW/SW Flow Control	Auto RS-485 Half-Duplex Control	Fractional Baud Rate Generator	Power Down Mode	5V Tolerant Inputs	Supply Voltage Range	No. of GPIOs	Packages
XR17V258	PCI Bus 3.0	8	8	64 / 64	✓	✓	✓	✓	✓	✓	✓	3.0V-3.6V	8	LQFP-144
XR17V254	PCI Bus 3.0	4	8	64 / 64	✓	✓	✓	✓	✓	✓	✓	3.0V-3.6V	8	LQFP-144
XR17V252	PCI Bus 3.0	2	8	64 / 64	✓	✓	✓	✓	✓	✓	✓	3.0V-3.6V	8	TQFP-100

PCI UARTs (Universal 3.3V or 5V)														
UART Device	Data Bus Interface	UART Ch.	Max Data Rate (Mbps)	TX/RX FIFO Bytes	TX & RX FIFO Level Counters	Program. Trigger Levels	Auto HW/SW Flow Control	Auto RS-485 Half-Duplex Control	Fractional Baud Rate Generator	Power Down Mode	5V Tolerant Inputs	Supply Voltage Range	No. of GPIOs	Packages
XR17D158	PCI Bus 2.2	8	6.25	64 / 64	✓	✓	✓	✓		✓	✓	3.0V-3.6V 4.5V-5.5V	8	LQFP-144
XR17D154	PCI Bus 2.2	4	6.25	64 / 64	✓	✓	✓	✓		✓	✓	3.0V-3.6V 4.5V-5.5V	8	LQFP-144
XR17D152	PCI Bus 2.2	2	6.25	64 / 64	✓	✓	✓	✓		✓	✓	3.0V-3.6V 4.5V-5.5V	8	TQFP-100

PCI UARTs (5V)														
UART Device	Data Bus Interface	UART Ch.	Max Data Rate (Mbps)	TX/RX FIFO Bytes	TX & RX FIFO Level Counters	Program. Trigger Levels	Auto HW/SW Flow Control	Auto RS-485 Half-Duplex Control	Fractional Baud Rate Generator	Power Down Mode	5V Tolerant Inputs	Supply Voltage Range	No. of GPIOs	Packages
XR17C158	PCI Bus 2.2	8	6.25	64 / 64	✓	✓	✓	✓		✓	✓	4.5V-5.5V	8	LQFP-144
XR17C154	PCI Bus 2.2	4	6.25	64 / 64	✓	✓	✓	✓		✓	✓	4.5V-5.5V	8	LQFP-144
XR17C152	PCI Bus 2.2	2	6.25	64 / 64	✓	✓	✓	✓		✓	✓	4.5V-5.5V	8	TQFP-100

RS-485 Example in Industrial Controls



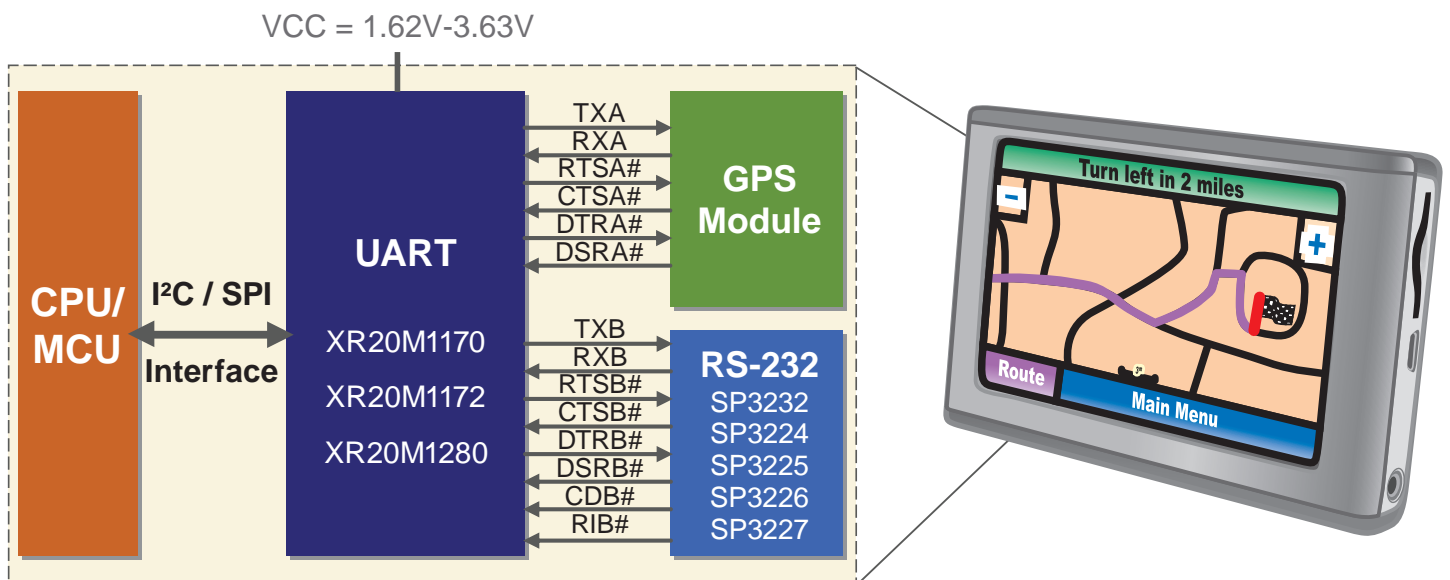
The simple 2-wire (I²C) or 4-wire (SPI) interface enables an Exar I²C/SPI UART to easily be added to any embedded system design. The I²C interface can support fast mode with an I²C clock frequency of up to 400kHz. The SPI interface can support a clock frequency of up to 5MHz. The maximum UART baud rate is 16Mbps at 3.3V.

Sample Code

A software example for initializing the I²C/SPI UART is available from Exar.

I ² C/SPI UARTs															
UART Device	Data Bus Interface	UART Ch.	Max Data Rate (Mbps)	TX/RX FIFO Bytes	TX & RX FIFO Level Counters	Program. Trigger Levels	Auto HW/SW Flow Control	Auto RS-485 Half-Duplex Control	Multidrop (9-bit) mode	Fractional Baud Rate Generator	Power Down Mode	Integrated Level Shifters	Supply Voltage Range	No. of GPIOs	Packages
XR20M1172	I ² C or SPI	2	16.0 @ 3.3V 12.5 @ 2.5V 8.0 @ 1.8V	64 / 64	✓	✓	✓	✓		✓	✓		1.62V-3.63V	8 8	QFN-32 TSSOP-28
XR20M1280	I ² C or SPI	1	24.0 @ 3.3V 16.0 @ 2.5V 10.0 @ 1.8V	128 / 128	✓	✓	✓	✓	✓	✓	✓	✓	1.62V-3.63V	16 8 4	QFN-40 QFN-32 QFN-24
XR20M1170	I ² C or SPI	1	16.0 @ 3.3V 12.5 @ 2.5V 8.0 @ 1.8V	64 / 64	✓	✓	✓	✓		✓	✓		1.62V-3.63V	n/a 8 8	QFN-16 QFN-24 TSSOP-16 TSSOP-24

I²C/SPI Application Example



8-bit UARTs

The 8-bit UART product family is Exar's largest UART product family with more than 70 UARTs. The 8-bit UART product family consists of 1-ch, 2-ch, 4-ch and 8-ch UARTs with FIFOs ranging from 1 byte up to 128 bytes. All of the UARTs have either an 8-bit Intel bus interface or Motorola bus interface.

VLIO UARTs

The VLIO UART product family is Exar's newest 8-bit UART product family. With the combination of low power consumption in the Sleep/PowerSave mode (less than 3uA at 1.8V) and in the industry's smallest packages, including a 3x3x0.9mm BGA package, the VLIO UARTs are ideal for battery-powered applications.

Intel bus interface vs. Motorola bus interface

The primary difference between the Intel bus interface and the Motorola bus interface is the read and write control lines. For the Intel bus interface, there are separate control lines for the read and write strobes (IOR# and IOW#). However, the Motorola bus interface only has a single control line (R/W#).

VLIO bus interface vs. Intel/Motorola bus interface

The primary differences between the VLIO bus interface and the Intel or Motorola bus interfaces are the address and data lines. The address and data lines are separate for the Intel/Motorola bus interface, while the address and data lines are multiplexed for the VLIO bus interface.

Software Drivers/Sample Test Programs

Exar's 8-bit UARTs will work with the standard serial driver in most operating systems. However, software drivers to support Exar's enhanced features are available for Windows 95/98, NT 4.0, 2000, XP, CE 4.2, CE 5.0 and CE 6.0 for various UARTs. In addition, VxWorks 5.5, Linux 2.4.x, Linux 2.6.x drivers and sample DOS test programs are available.

8-bit UARTs: "C" UART Product Family

The "C" UART product family is the 5V UART product family. Some UARTs in this product family are 5V only devices, but most UARTs in this family can operate with a 2.97V supply voltage. The maximum baud rate is up to 6.25Mbps.

UART Device	Data Bus Interface	UART Ch.	Max Data Rate (Mbps)	TX/RX FIFO Bytes	TX & RX FIFO Level Counters	Program. Trigger Levels	Auto HW/SW Flow Control	Auto RS-485 Half-Duplex Control	Multidrop (9-bit) mode	Fractional Baud Rate Generator	Power Down Mode	5V Tolerant Inputs	Supply Voltage Range	Packages
XR16C864	Intel or Motorola	4	2.0 @ 5V 1.5 @ 3.3V	128 / 128	✓	✓	✓	✓			✓	✓	2.97V-5.5V	QFP-100
XR16C854 / 854D	Intel or Motorola	4	2.0 @ 5V 1.5 @ 3.3V	128 / 128	✓	✓	✓	✓			✓	✓	2.97V-5.5V	PLCC-68 LQFP-64 QFP-100
ST16C654 / 654D	Intel or Motorola	4	1.5 @ 5V 0.5 @ 3.3V	64 / 64			✓				✓		2.97V-5.5V	PLCC-68 LQFP-64 QFP-100
ST16C554 / 554D	Intel or Motorola	4	1.5 @ 5V 0.5 @ 3.3V	16 / 16									2.97V-5.5V	PLCC-68 LQFP-64
ST68C554	Motorola	4	1.5 @ 5V 0.5 @ 3.3V	16 / 16									2.97V-5.5V	PLCC-68
ST16C454	Intel or Motorola	4	1.5 @ 5V 0.5 @ 3.3V	1 / 1									2.97V-5.5V	PLCC-68
XR16C2850	Intel	2	6.25 @ 5V 4.0 @ 3.3V	128 / 128	✓	✓	✓	✓			✓	✓	2.97V-5.5V	PLCC-44 TQFP-48
XR16C2852	Intel	2	6.25 @ 5V 4.0 @ 3.3V	128 / 128	✓	✓	✓	✓			✓	✓	2.97V-5.5V	PLCC-44
ST16C2550	Intel	2	4.0 @ 5V 1.875 @ 3.3V	16 / 16								✓	2.97V-5.5V	PDIP-40 PLCC-44 TQFP-48
ST16C2552	Intel	2	4.0 @ 5V 1.875 @ 3.3V	16 / 16								✓	2.97V-5.5V	PLCC-44
ST16C2450	Intel	2	1.5 @ 5V 0.5 @ 3.3V	1 / 1								✓	2.97V-5.5V	PDIP-40 PLCC-44 TQFP-48
XR16C850	Intel or PC COM Port	1	2.0 @ 5V 1.375 @ 3.3V	128 / 128	✓	✓	✓	✓			✓	✓	2.97V-5.5V	PLCC-44 TQFP-48
ST16C650A	Intel or PC COM Port	1	3.0 @ 5V 2.0 @ 3.3V	32 / 32			✓				✓	✓	2.97V-5.5V	PLCC-44 TQFP-48
ST16C580	Intel	1	1.5 @ 5V 0.5 @ 3.3V	16 / 16			✓				✓		2.97V-5.5V	TQFP-48
ST16C550	Intel	1	1.5 @ 5V 0.5 @ 3.3V	16 / 16									2.97V-5.5V	PDIP-40 PLCC-44 TQFP-48
ST16C450	Intel	1	1.5 @ 5V 0.5 @ 3.3V	1 / 1									2.97V-5.5V	PDIP-40 PLCC-44 TQFP-48
ST16C1550	Intel	1	1.5 @ 5V 0.5 @ 3.3V	16 / 16							✓		2.97V-5.5V	PLCC-28 TQFP-48

8-bit UARTs: "C" UART Product Family

The "C" UART product family is the 5V UART product family. Some UARTs in this product family are 5V only devices, but most UARTs in this family can operate with a 2.97V supply voltage. The maximum baud rate is up to 6.25Mbps.

UART Device	Data Bus Interface	UART Ch.	Max Data Rate (Mbps)	TX/RX FIFO Bytes	TX & RX FIFO Level Counters	Program. Trigger Levels	Auto HW/SW Flow Control	Auto RS-485 Half-Duplex Control	Multidrop (9-bit) mode	Fractional Baud Rate Generator	Power Down Mode	5V Tolerant Inputs	Supply Voltage Range	Packages
ST16C1551	Intel	1	1.5 @ 5V 0.5 @ 3.3V	16 / 16							✓		2.97V-5.5V	PLCC-28 TQFP-48
ST16C1450	Intel	1	1.5 @ 5V 0.5 @ 3.3V	1 / 1							✓		2.97V-5.5V	PLCC-28 TQFP-48
ST16C552* / 552A*	Intel	2	1.5 @ 5V 0.5 @ 3.3V	16 / 16							✓	✓	2.97V-5.5V	PLCC-68
ST16C452* / 452PS*	Intel	2	1.5 @ 5V 0.5 @ 3.3V	1 / 1							✓	✓	2.97V-5.5V	PLCC-68
XR82C684	Intel or Motorola	4	1.0 @ 5V	3 / 3					✓		✓		4.5V-5.5V	PLCC-44 PLCC-68
XR68/88C192	Intel or Motorola	2	1.0 @ 5V 0.5 @ 3.3V	16 / 16			✓		✓		✓	✓	2.97V-5.5V	PLCC-44 LQFP-44
XR68/88C92	Intel or Motorola	2	1.0 @ 5V 0.5 @ 3.3V	8 / 8			✓		✓		✓	✓	2.97V-5.5V	PDIP-40 PLCC-44 LQFP-44
XR68C681	Motorola	2	1.0 @ 5V	1 / 3			✓		✓		✓		4.5V-5.5V	PLCC-44 PDIP-40
XR88C681	Intel	2	1.0 @ 5V	1 / 3			✓		✓		✓		4.5V-5.5V	PLCC-44 PDIP-40

*This device also has a printer port.

8-bit UARTs: "L" UART Product Family

Most UARTs in the "L" UART product family can operate with a supply voltage of 2.25V-5.5V. All UARTs in the "L" UART product family have 5V tolerant inputs so they can interface with legacy 5V devices but can operate at lower supply voltage. In addition to operating at a lower voltage, the "L" UART product family has a Sleep/PowerSave mode to minimize the power consumption. The maximum baud rate is up to 6.25Mbps.

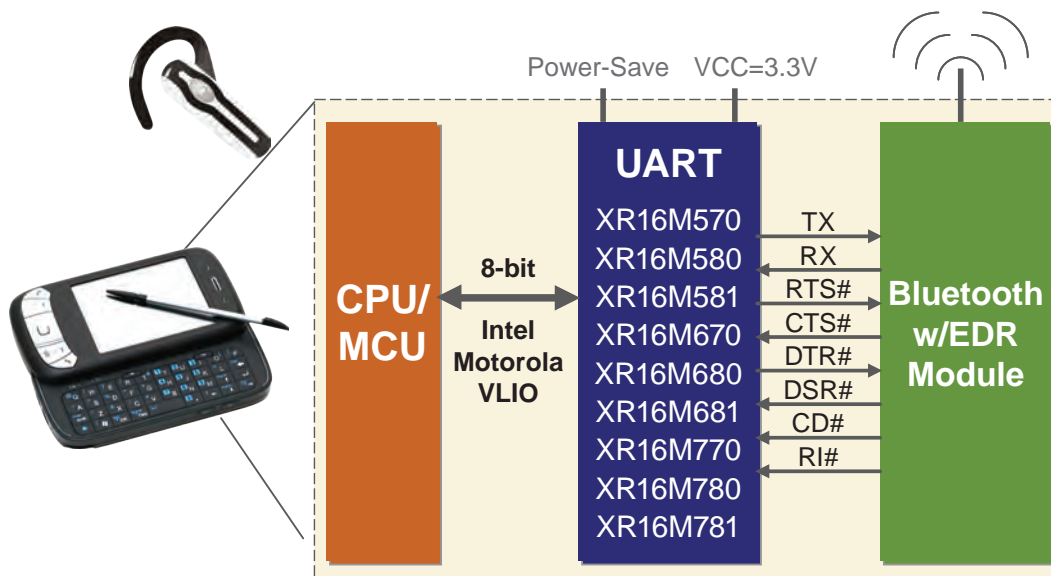
UART Device	Data Bus Interface	UART Ch.	Max Data Rate (Mbps)	TX/RX FIFO Bytes	TX & RX FIFO Level Counters	Program. Trigger Levels	Auto HW/SW Flow Control	Auto RS-485 Half-Duplex Control	Multidrop (9-bit) mode	Fractional Baud Rate Generator	Power Down Mode	5V Tolerant Inputs	Supply Voltage Range	Packages
XR16L788	Intel or Motorola	8	6.25 @ 5V 4.0 @ 3.3V	64 / 64	✓	✓	✓	✓			✓	✓	2.25V-5.5V	QFP-100
XR16L784	Intel or Motorola	4	6.25 @ 5V 4.0 @ 3.3V	64 / 64	✓	✓	✓	✓			✓	✓	2.25V-5.5V	LQFP-64
XR16L2750	Intel	2	6.0 @ 5V 4.0 @ 3.3V 3.0 @ 2.5V	64 / 64	✓	✓	✓	✓			✓	✓	2.25V-5.5V	PLCC-44 TQFP-48
XR16L2751	Intel or Motorola	2	6.0 @ 5V 4.0 @ 3.3V 3.0 @ 2.5V	64 / 64	✓	✓	✓	✓			✓	✓	2.25V-5.5V	TQFP-48
XR16L2752	Intel	2	6.0 @ 5V 4.0 @ 3.3V 3.0 @ 2.5V	64 / 64	✓	✓	✓	✓			✓	✓	2.25V-5.5V	PLCC-44
XR16L2550	Intel	2	4.0 @ 5V 2.0 @ 3.3V 1.0 @ 2.5V	16 / 16			✓				✓	✓	2.25V-5.5V	PLCC-44 TQFP-48 QFN-32
XR16L2551	Intel or Motorola	2	4.0 @ 5V 2.0 @ 3.3V 1.0 @ 2.5V	16 / 16			✓				✓	✓	2.25V-5.5V	TQFP-48 QFN-32
XR16L2552	Intel	2	4.0 @ 5V 2.0 @ 3.3V 1.0 @ 2.5V	16 / 16			✓				✓	✓	2.25V-5.5V	PLCC-44 TQFP-48
XR16L2450	Intel	2	4.0 @ 5V 2.0 @ 3.3V 1.0 @ 2.5V	1 / 1							✓	✓	2.25V-5.5V	PLCC-44 TQFP-48
XR16L651	Intel or Motorola	1	3.0 @ 5V 2.0 @ 3.3V 1.0 @ 2.5V	32 / 32			✓	✓			✓	✓	2.25V-5.5V	TQFP-48
XR16L570	Intel	1	3.0 @ 5V 2.0 @ 3.3V 1.5 @ 2.5V 0.75 @ 1.8V	16 / 16			✓				✓	✓	1.62V-5.5V	QFN-24 QFN-32
XR16L580	Intel or Motorola	1	3.0 @ 5V 2.0 @ 3.3V 1.5 @ 2.5V	16 / 16			✓				✓	✓	2.25V-5.5V	QFN-24 QFN-28 QFN-32 TQFP-48

8-bit UARTs: "V" UART Product Family

The "V" UART product family is a high performance UART product family. At 3.3V, some UARTs in this UART product family have a maximum baud rate of 16Mbps. The operating voltage range for the "V" UARTs is from 2.25V-3.63V. All "V" UARTs have 5V tolerant inputs. The "V" UART product family was the first UART product family to have Exar's innovative Fractional Baud Rate Generator feature.

UART Device	Data Bus Interface	UART Ch.	Max Data Rate (Mbps)	TX/RX FIFO Bytes	TX & RX FIFO Level Counters	Program. Trigger Levels	Auto HW/SW Flow Control	Auto RS-485 Half-Duplex Control	Multidrop (9-bit) mode	Fractional Baud Rate Generator	Power Down Mode	5V Tolerant Inputs	Supply Voltage Range	Packages
XR16V798	Intel or Motorola	8	8.0 @ 3.3V 6.25 @ 2.5V	64 / 64	✓	✓	✓	✓		✓	✓	✓	2.25V-3.63V	QFP-100
XR16V698	Intel or Motorola	8	15.0 @ 3.3V 10.0 @ 2.5V	32 / 32	✓		✓	✓	✓	✓	✓	✓	2.25V-3.63V	QFP-100
XR16V598	Intel or Motorola	8	15.0 @ 3.3V 10.0 @ 2.5V	16 / 16	✓		✓	✓	✓	✓	✓	✓	2.25V-3.63V	QFP-100
XR16V794	Intel or Motorola	4	8.0 @ 3.3V 6.25 @ 2.5V	64 / 64	✓	✓	✓	✓		✓	✓	✓	2.25V-3.63V	LQFP-64
XR16V654 / 654D	Intel or Motorola	4	16.0 @ 3.3V 12.5 @ 2.5V	64 / 64			✓			✓	✓	✓	2.25V-3.63V	QFN-48 PLCC-68 LQFP-64 LQFP-80 QFP-100
XR16V564 / 564D	Intel or Motorola	4	16.0 @ 3.3V 12.5 @ 2.5V	32 / 32			✓			✓	✓	✓	2.25V-3.63V	QFN-48 PLCC-68 LQFP-64 LQFP-80
XR16V554 / 554D	Intel or Motorola	4	8.0 @ 3.3V 6.25 @ 2.5V	16 / 16								✓	2.25V-3.63V	QFN-48 PLCC-68 LQFP-64 LQFP-80
XR16V2750	Intel	2	8.0 @ 3.3V 6.25 @ 2.5V	64 / 64	✓	✓	✓	✓		✓	✓	✓	2.25V-3.63V	TQFP-48 QFN-32
XR16V2751	Intel or Motorola	2	8.0 @ 3.3V 6.25 @ 2.5V	64 / 64	✓	✓	✓	✓		✓	✓	✓	2.25V-3.63V	TQFP-48
XR16V2752	Intel	2	8.0 @ 3.3V 6.25 @ 2.5V	64 / 64	✓	✓	✓	✓		✓	✓	✓	2.25V-3.63V	PLCC-44 QFN-32
XR16V2650	Intel	2	16.0 @ 3.3V 12.5 @ 2.5V	32 / 32	✓		✓			✓	✓	✓	2.25V-3.63V	TQFP-48 QFN-32
XR16V2651	Intel or Motorola	2	16.0 @ 3.3V 12.5 @ 2.5V	32 / 32	✓		✓			✓	✓	✓	2.25V-3.63V	TQFP-48 QFN-32
XR16V2652	Intel	2	16.0 @ 3.3V 12.5 @ 2.5V	32 / 32	✓		✓			✓	✓	✓	2.25V-3.63V	PLCC-44 QFN-32
XR16V2550	Intel	2	16.0 @ 3.3V 12.5 @ 2.5V	16 / 16	✓		✓			✓	✓	✓	2.25V-3.63V	TQFP-48 QFN-32
XR16V2551	Intel or Motorola	2	16.0 @ 3.3V 12.5 @ 2.5V	16 / 16	✓		✓			✓	✓	✓	2.25V-3.63V	TQFP-48 QFN-32
XR16V2552	Intel	2	16.0 @ 3.3V 12.5 @ 2.5V	16 / 16	✓		✓			✓	✓	✓	2.25V-3.63V	PLCC-44 QFN-32

Cell Phone with Bluetooth



8-bit UARTs: "M" UART Product Family

The "M" UART product family is a low voltage and high performance UART product family. The "M" UART product family can operate from 1.62V-3.63V with a maximum baud rate of up to 16Mbps at 3.3V. Like the "V" UART product family, the "M" UART product family also has the Fractional Baud Rate Generator feature. Unlike the "V" UART product family, the "M" UART product family does not have 5V tolerant inputs.

UART Device	Data Bus Interface	UART Ch.	Max Data Rate (Mbps)	TX/RX FIFO Bytes	TX & RX FIFO Level Counters	Program. Trigger Levels	Auto HW/SW Flow Control	Auto RS-485 Half-Duplex Control	Multidrop (9-bit) mode	Fractional Baud Rate Generator	Power Down Mode	Supply Voltage Range	Packages
XR16M698	Intel or Motorola	8	15.0 @ 3.3V 10.0 @ 2.5V 5.0 @ 1.8V	32 / 32	✓		✓	✓	✓	✓	✓	1.62V-3.63V	QFP-100
XR16M598	Intel or Motorola	8	15.0 @ 3.3V 10.0 @ 2.5V 5.0 @ 1.8V	16 / 16	✓		✓	✓	✓	✓	✓	1.62V-3.63V	QFP-100
XR16M654 / 654D	Intel or Motorola	4	16.0 @ 3.3V 12.5 @ 2.5V 8.0 @ 1.8V	64 / 64			✓			✓	✓	1.62V-3.63V	QFN-48 PLCC-68 LQFP-64 LQFP-80 QFP-100
XR16M564 / 564D	Intel or Motorola	4	16.0 @ 3.3V 12.5 @ 2.5V 8.0 @ 1.8V	32 / 32			✓			✓	✓	1.62V-3.63V	QFN-48 PLCC-68 LQFP-64 LQFP-80
XR16M554 / 554D	Intel or Motorola	4	8.0 @ 3.3V 6.25 @ 2.5V 4.0 @ 1.8V	16 / 16								1.62V-3.63V	QFN-48 PLCC-68 LQFP-64 LQFP-80
XR16M2750	Intel	2	8.0 @ 3.3V 6.25 @ 2.5V 4.0 @ 1.8V	64 / 64	✓	✓	✓	✓		✓	✓	1.62V-3.63V	TQFP-48 QFN-32
XR16M2751	Intel or Motorola	2	8.0 @ 3.3V 6.25 @ 2.5V 4.0 @ 1.8V	64 / 64	✓	✓	✓	✓		✓	✓	1.62V-3.63V	TQFP-48
XR16M2752	Intel	2	8.0 @ 3.3V 6.25 @ 2.5V 4.0 @ 1.8V	64 / 64	✓	✓	✓	✓		✓	✓	1.62V-3.63V	PLCC-44 QFN-32
XR16M752	Intel	2	16.0 @ 3.3V 12.5 @ 2.5V 8.0 @ 1.8V	64 / 64	✓	✓	✓	✓		✓	✓	1.62V-3.63V	TQFP-48 QFN-32
XR68M752	Intel or Motorola	2	16.0 @ 3.3V 12.5 @ 2.5V 8.0 @ 1.8V	64 / 64	✓	✓	✓	✓		✓	✓	1.62V-3.63V	BGA-49 TQFP-48 QFN-32
XR16M2650	Intel	2	16.0 @ 3.3V 12.5 @ 2.5V 8.0 @ 1.8V	32 / 32	✓		✓			✓	✓	1.62V-3.63V	TQFP-48 QFN-32
XR16M2651	Intel or Motorola	2	16.0 @ 3.3V 12.5 @ 2.5V 8.0 @ 1.8V	32 / 32	✓		✓			✓	✓	1.62V-3.63V	TQFP-48 QFN-32
XR16M2550	Intel	2	16.0 @ 3.3V 12.5 @ 2.5V 8.0 @ 1.8V	16 / 16	✓		✓			✓	✓	1.62V-3.63V	TQFP-48 QFN-32
XR16M2551	Intel or Motorola	2	16.0 @ 3.3V 12.5 @ 2.5V 8.0 @ 1.8V	16 / 16	✓		✓			✓	✓	1.62V-3.63V	TQFP-48 QFN-32
XR16M890*	Intel/ Motorola/ VLIO	1	25.0 @ 3.3V 16.0 @ 2.5V 9.0 @ 1.8V	128 / 128	✓	✓	✓	✓	✓	✓	✓	1.62V-3.63V	TQFP-48 QFN-40 QFN-32
XR16M770	Intel	1	16.0 @ 3.3V 12.5 @ 2.5V 7.5 @ 1.8V	64 / 64	✓	✓	✓	✓	✓	✓	✓	1.62V-3.63V	QFN-24 BGA-25 QFN-32
XR16M780	Intel or Motorola	1	16.0 @ 3.3V 12.5 @ 2.5V 7.5 @ 1.8V	64 / 64	✓	✓	✓	✓	✓	✓	✓	1.62V-3.63V	BGA-25 QFN-32 TQFP-48
XR16M781	VLIO	1	20.0 @ 3.3V 16.0 @ 2.5V 10.0 @ 1.8V	64 / 64	✓	✓	✓	✓	✓	✓	✓	1.62V-3.63V	QFN-24 BGA-25 QFN-32
XR16M670	Intel	1	16.0 @ 3.3V 12.5 @ 2.5V 7.5 @ 1.8V	32 / 32	✓		✓	✓	✓	✓	✓	1.62V-3.63V	QFN-24 BGA-25 QFN-32
XR16M680	Intel or Motorola	1	16.0 @ 3.3V 12.5 @ 2.5V 7.5 @ 1.8V	32 / 32	✓		✓	✓	✓	✓	✓	1.62V-3.63V	BGA-25 QFN-32 TQFP-48
XR16M681	VLIO	1	20.0 @ 3.3V 16.0 @ 2.5V 10.0 @ 1.8V	32 / 32	✓		✓	✓	✓	✓	✓	1.62V-3.63V	QFN-24 BGA-25 QFN-32
XR16M570	Intel	1	16.0 @ 3.3V 12.5 @ 2.5V 7.5 @ 1.8V	16 / 16	✓		✓	✓	✓	✓	✓	1.62V-3.63V	QFN-24 BGA-25 QFN-32
XR16M580	Intel or Motorola	1	16.0 @ 3.3V 12.5 @ 2.5V 7.5 @ 1.8V	16 / 16	✓		✓	✓	✓	✓	✓	1.62V-3.63V	BGA-25 QFN-32 TQFP-48
XR16M581	VLIO	1	20.0 @ 3.3V 16.0 @ 2.5V 10.0 @ 1.8V	16 / 16	✓		✓	✓	✓	✓	✓	1.62V-3.63V	QFN-24 BGA-25 QFN-32

*This device has integrated level shifters and up to 16 GPIOs.

Exar's UART + Transceivers Combo family combines a UART and serial transceiver into a single QFN package. The small package makes it ideal for space-constrained applications, simplifies the hardware and minimizes the BOM. There are 3 types of combos:

- 8-bit UART + RS-232 transceiver
- 8-bit UART + RS-485 transceiver
- I²C/SPI + RS-232 transceiver

UART + Transceiver Combos - 8-bit UART + RS-232 transceiver													
UART Device	Data Bus Interface	UART Ch.	Max Data Rate (Mbps)	TX/RX FIFO Bytes	TX & RX FIFO Level Counters	Program. Trigger Levels	Auto HW/SW Flow Control	Auto RS-485 Half-Duplex Control	Fractional Baud Rate Generator	5V Tolerant Inputs	Power Down Mode	Supply Voltage Range	Packages
XR19L202	Intel or Motorola	2	1 @ 5V 1 @ 3.3V	64 / 64	✓	✓	✓	✓	✓	✓	✓	3.3V-5.5V	QFN-48
XR19L212	Intel or Motorola	2	1 @ 5V 1 @ 3.3V	64 / 64	✓	✓	✓	✓	✓	✓	✓	3.3V-5.5V	QFN-48
XR19L222	Intel or Motorola	2	1 @ 5V 1 @ 3.3V	64 / 64	✓	✓	✓	✓	✓	✓	✓	3.3V-5.5V	QFN-64
XR19L200	Intel or Motorola	1	0.25 @ 5V 0.25 @ 3.3V	16 / 16			✓			✓	✓	3.0V-5.5V	QFN-32
XR19L210	Intel or Motorola	1	0.25 @ 5V 0.25 @ 3.3V	16 / 16			✓			✓	✓	3.0V-5.5V	QFN-40
XR19L220	Intel or Motorola	1	0.25 @ 5V 0.25 @ 3.3V	16 / 16			✓			✓	✓	3.0V-5.5V	QFN-40

UART + Transceiver Combos - 8-bit UART + RS-485 transceiver													
UART Device	Data Bus Interface	UART Ch.	Max Data Rate (Mbps)	TX/RX FIFO Bytes	TX & RX FIFO Level Counters	Program. Trigger Levels	Auto HW/SW Flow Control	Auto RS-485 Half-Duplex Control	Fractional Baud Rate Generator	5V Tolerant Inputs	Power Down Mode	Supply Voltage Range	Packages
XR19L402	Intel or Motorola	2	8 @ 5V 8 @ 3.3V	64 / 64	✓	✓		✓	✓	✓	✓	2.97V-3.63V 4.5V-5.5V	QFN-48
XR19L400	Intel or Motorola	1	8 @ 5V 8 @ 3.3V	64 / 64	✓	✓		✓	✓	✓	✓	2.97V-3.63V 4.5V-5.5V	QFN-40

UART + Transceiver Combos - I ² C/SPI + RS-232 transceiver													
UART Device	Data Bus Interface	UART Ch.	Max Data Rate (Mbps)	TX/RX FIFO Bytes	TX & RX FIFO Level Counters	Program. Trigger Levels	Auto HW/SW Flow Control	Auto RS-485 Half-Duplex Control	Fractional Baud Rate Generator	5V Tolerant Inputs	Power Down Mode	Supply Voltage Range	Packages
XR20V2172	I ² C or SPI	2	1.0 @ 5V 1.0 @ 3.3V	64 / 64	✓	✓	✓	✓	✓		✓	3.3V-5.5V	QFN-64
XR20V2170	I ² C or SPI	1	0.25 @ 3.3V	64 / 64	✓	✓	✓	✓	✓		✓	2.97V-3.63V	QFN-40

Exar's Wireless UART chipset consists of a Wireless UART controller and 900MHz RF Transceiver. With Exar's proprietary firmware, the Wireless UART chipset can be used as a serial cable replacement wireless solution.

Wireless UARTs															
Name	Description	Interfaces	UART CH	Tx/Rx FIFO (Bytes)	Auto RTS/CTS	5V Tol Inputs	Frequency	Data Rate @ 868.3MHz	Data Rate @ 903-927MHz	Rx Sensitivity @ 100Kbps	Rx Sensitivity @ 250Kbps	Output Power	Supply Voltage Range	Packages	
XR18W750	Wireless UART Controller	Parallel (8-bit), Serial, I ² C Master	1	64/64	✓	✓							2.25-3.63V	QFN-48	
XR18W753	Single Chip 868MHZ to 956MHZ RF Transceiver	I ² C Slave					868-956MHz	100Kbps	250Kbps	-94dBm	-91dBm	-24-0dBm	2.2-3.6V	QFN-48	

The newest product family in Exar's Connectivity portfolio is the GPIO Expander, offered with either I2C/SMBus or SPI interfaces. The I2C/SMBus GPIO Expanders are pin and software compatible to existing 8-bit and 16-bit I2C/SMBus GPIO Expanders, but with enhanced features and functionality. The SPI GPIO Expanders operate with a high speed SPI clock of up to 26MHz.

Individually Programmable

Each GPIO can be individually configured as an input or an output. In addition, each feature listed below can individually enabled or disabled for each GPIO.

Internal Pull-up Resistors

When configured as an input, the internal pull-up resistor can be enabled for selected GPIOs configured as inputs. Exar's "P" devices have the internal pull-up resistor enabled at power-up, which can be individually disabled on each input.

Rising / Falling Edge Interrupts

Each GPIO input can be configured to generate an interrupt on the rising edge, falling edge, or both edges.

Interrupt Mask / Enable

Interrupts can be masked / enabled for each GPIO input so that only selected inputs will generate interrupts.

Stored Interrupt Status

The GPIO Expanders have an interrupt status register which allows the software in the host controller to easily identify which input generated the interrupt. The GPIO Expander can also be configured so that the interrupt status remains in the status register even after the input has changed back to its original state.

Input Glitch Filtering

Selectable GPIO input filtering ignores pulses that are less than 225 ns. The GPIO state will not be updated and there will not be any interrupts reported from noise or small glitches when this feature is enabled.

Tri-State Outputs

GPIO outputs can be individually tri-stated. This is useful for applications where the GPIO output is connected to an input of a device that is powered down, or when driving a tri-state logic input pin.

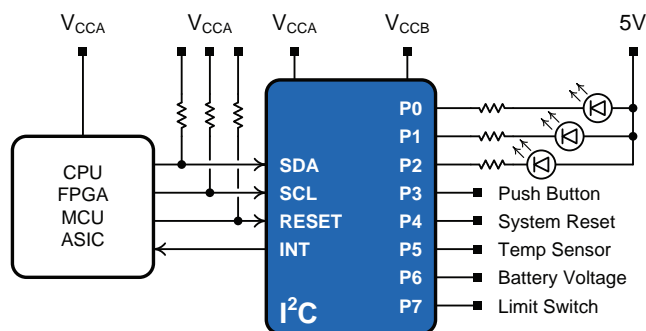
I²C GPIO Expanders

Name	CPU Interface	No. of GPIOs	Interrupt Output Pin	Reset Input Pin	Integrated Level Shifters	Internal Pull-Up Resistors Enabled at Power-up	5V Tol Inputs	Supply Voltage Range	Packages
XRA1200	I ² C/SMBus	8	✓				✓	1.65V - 3.6V	QFN-16 TSSOP-16
XRA1200P	I ² C/SMBus	8	✓			✓	✓	1.65V - 3.6V	QFN-16 TSSOP-16
XRA1201	I ² C/SMBus	16	✓				✓	1.65V - 3.6V	QFN-24 TSSOP-24
XRA1201P	I ² C/SMBus	16	✓			✓	✓	1.65V - 3.6V	QFN-24 TSSOP-24
XRA1202	I ² C/SMBus	8	✓	✓			✓	1.65V - 3.6V	QFN-16 TSSOP-16
XRA1203	I ² C/SMBus	16	✓	✓			✓	1.65V - 3.6V	QFN-24 TSSOP-24
XRA1206	I ² C/SMBus	8	✓	✓	✓		✓	1.65V - 3.6V	QFN-16 TSSOP-16
XRA1207	I ² C/SMBus	16	✓	✓	✓		✓	1.65V - 3.6V	QFN-24 TSSOP-24

SPI GPIO Expanders

Name	CPU Interface	No. of GPIOs	Interrupt Output Pin	Reset Input Pin	Integrated Level Shifters	Internal Pull-Up Resistors Enabled at Power-up	5V Tol Inputs	Supply Voltage Range	Packages
XRA1402	SPI	8	✓	✓			✓	1.65V - 3.6V	QFN-16 TSSOP-16
XRA1403	SPI	16	✓	✓			✓	1.65V - 3.6V	QFN-24 TSSOP-24
XRA1404	SPI	8	✓		✓		✓	1.65V - 3.6V	QFN-16 TSSOP-16
XRA1405	SPI	16	✓		✓		✓	1.65V - 3.6V	QFN-24 TSSOP-24

GPIO Expander Application Diagram



Exar offers a complete portfolio of RS-232, RS-485, RS-422 and Multiprotocol transceivers with data rates up to 52Mbps. Exar is the market leader in high-speed RS-485/RS-422 and Multiprotocol transceivers. In addition, Exar offers a broad family of feature-rich RS-232 serial transceivers.

Exar uses state of the art structures to protect the transceiver pins against ESD of $\pm 15\text{kV}$ without damage. The ESD structures withstand high ESD in all states: normal operation, shutdown and powered down. After an ESD event, the transceivers keep working without latch-up or damage. ESD protection can be tested in various ways. The transmitter outputs and receiver inputs are characterized for protection to the following limits:

- $\pm 15\text{kV}$ using the Human Body Model
- $\pm 8\text{kV}$ using the Contact Discharge method specified in IEC 61000-4-2
- $\pm 15\text{kV}$ using the Air-Gap Discharge method specified in IEC 61000-4-2

Key Features and Technologies

Pin-to-Pin Compatibility

Exar's RS-232 and RS-485/422 transceivers are offered in industry standard packages and pinouts. Therefore, migrating to faster RS-232 or RS-485/422 transceivers with additional features can be accomplished with minimal changes to the design.

Internal Termination

The SP338E and SP339E dual protocol transceivers offer internal cable termination in RS-485/422 modes. The SP3508, SP508E and SP510E also offer internal V.11 and V.35 termination networks for the clock and data lines. Eliminating the external termination greatly simplifies the system design, resulting in reduced board space and quicker time to market.

Hot Swap / Power-Up Glitch Protection

This feature prevents random data errors from appearing on the RS-485/422 differential pairs due to undefined logic levels during power-up that improperly enable the transceivers.

1/8th Unit Load

A standard RS-485/422 driver can drive up to 32 unit loads. The 1/8th unit load receiver input impedance allows eight times as many transceivers (up to 256) to be connected in parallel on a communication line.

Enhanced Receiver Failsafe

The Enhanced Receiver Failsafe feature ensures that the TTL outputs are in a known state when the RS-485/422 differential pairs are floating, shorted, or terminated but idle, without the need for any external biasing resistors.

PROFIBUS

PROFIBUS is widely used in industrial control and automation applications and is ruggedized for use in harsh operating conditions. Exar's XR5486-88E and SP1486E products are PROFIBUS compliant and feature high differential output swing for improved noise immunity or to drive longer data cables.

Slew Rate Limited Options

Slew limited drivers minimize EMI (Electromagnetic Interference) and reduce reflections caused by improperly terminated cables. This allows for error-free data transmission over longer communication lines.

Auto On-Line® Feature

Auto On-Line saves power by turning off the charge pumps and driver outputs when the RS-232 inputs see less than valid $\pm 3\text{V}$ signals (ie. cable is unplugged). The RS-232 transceiver will automatically wake up from the low power state when a valid RS-232 voltage is sensed at the receiver input.

Auto On-Line® Plus Feature

Similar to above, Auto On-Line Plus saves power by turning off the charge pumps and driver outputs if there are no transitions on the driver or receiver inputs for 30 seconds. The transceiver returns to normal operation with a transition on any of the driver or receiver inputs.

Highly Efficient Charge Pump

The charge pump is used to generate positive and negative signal voltages for the RS-232 drivers. This enables fully compliant RS-232 and V.28 signals from a single 3.0 or 5.5V power supply. The charge pumps use four external capacitors to hold and transfer electrical charge. The patented design uses a unique approach compared to older less efficient designs.

Industry's ONLY Single Chip Solutions

Exar is the only one in the industry to offer single chip solutions that support RS-232, RS-485, RS-449, EIA-530, V.10, V.11, V.28, V.35, V.36, and X.21. As a result, Exar's solution takes up to 40% less board space than competitor solutions.

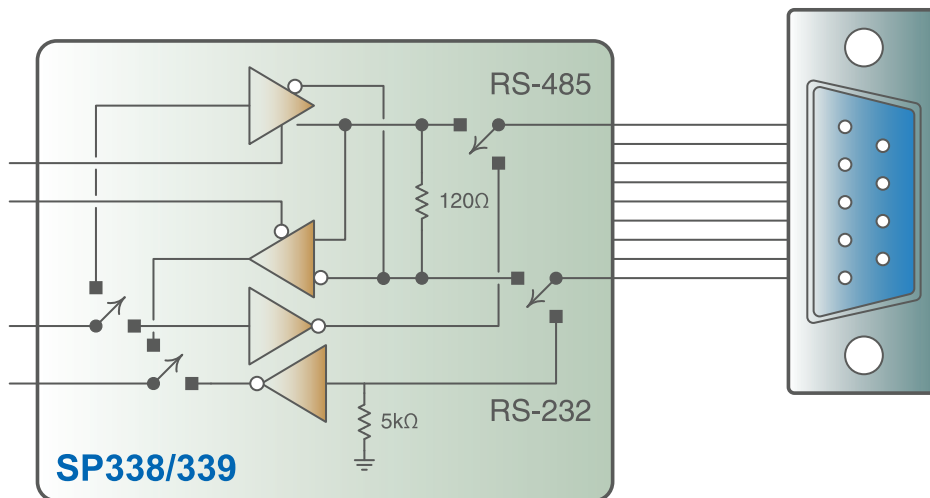
NET1/2 and TBR2 Compliance

SP3508, SP505, SP506, SP507, and SP508E are compliant to NET1/2 and TBR2 requirements.

Exar offers the industry's only single chip multiprotocol solutions and the fastest data rates, up to 52 Mbps. Multiprotocol transceivers support the popular serial protocols - V.10, V.11, V.28 (RS-232), V.35, V.36 (RS-449), EIA-530, EIA-530-A, and X.21. Advanced features like built-in cable termination, adjustable logic level, diagnostic loopback modes, and 15kV ESD protection provide maximum versatility and robust serial communication.

Multi Protocol Transceivers																					
Name	Drivers	Receivers	Data Rate (Mbps)	ESD (kV)	Internal Termination	Supported Protocols											V _L Pin	Supply Voltage Range	Packages		
						RS-232	RS-485	RS-422	RS-449	EIA-530	EIA-530A	V.10	V.11	V.28	V.35	V.36				X.21	
SP331	4	4	10	2		✓	✓	✓						✓				4.75V-5.25V	WSOIC-28		
SP332	4	4	10	2		✓	✓	✓						✓				4.75V-5.25V	WSOIC-28		
SP334	3	5	10	2		✓	✓	✓						✓				4.75V-5.25V	WSOIC-28		
SP336E	4	4	10	15		✓	✓	✓						✓				3.135V-3.465V 4.75V-5.25V	WSOIC-28 TSSOP-28		
SP337E	3	5	15	15		✓	✓	✓						✓				3.135V-3.465V 4.75V-5.25V	WSOIC-28 TSSOP-28		
SP338E	3	5	20	15	Complete	✓	✓	✓						✓				3.135V-3.465V 4.75V-5.25V	QFN--40		
SP339E	3	5	20	15	Complete	✓	✓	✓						✓				3.135V-3.465V 4.75V-5.25V	QFN--40		
SP3508	8	8	20	2	Complete	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	3V-3.6V	LQFP-100		
SP503	7	7	5	2		✓	✓	✓	✓	✓		✓	✓	✓			✓	4.75V-5.25V	LQFP-80		
SP504	7	7	10	2	Basic	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	4.75V-5.25V	LQFP-80		
SP505A	7	7	10	2	V.35, V.11	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	4.75V-5.25V	LQFP-80		
SP505B	7	7	16	2	V.35, V.11	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	4.75V-5.25V	LQFP-80		
SP506	7	7	20	2	V.35, V.11	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	4.75V-5.25V	LQFP-80		
SP507	7	7	20	2	V.35, V.11	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	4.75V-5.25V	LQFP-80		
SP508E	8	8	20	15	Complete	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	4.75V-5.25V	LQFP-100		
SP510E	8	8	52	15	Complete	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	4.75V-5.25V	LQFP-100		

Single-Chip Multiprotocol Transceivers



Exar has a diverse portfolio of RS-485/422 serial transceivers. Products range from industry standard transceivers to ultra high speed, 52Mbps and high differential output transceivers. In addition, Exar has RS-485/422 transceivers that are compliant to popular field buses including PROFIBUS. Advanced features like hotswap, enhanced failsafe, and 15kV ESD protection ensure reliable and robust data communication over long cable lengths.



3.3V RS-485/422 Transceivers

Name	Drivers	Receivers	Duplex	Data Rate (Mbps)	ESD (kV)	Rx Fail-Safe	Shutdown	Multi-Drop Nodes	Hot Swap	Transient Tolerance	Fault Tolerance	PROFIBUS	Packages
SP26LV431	4	0	Full	60	2	No		10					NSOIC-16
SP26LV432	0	4	Full	50	2	Open		10					NSOIC-16
SP3070E	1	1	Full	0.25	15	Open, Short, Idle	✓	256	✓				NSOIC-14
SP3071E	1	1	Full	0.25	15	Open, Short, Idle		256					NSOIC-8
SP3072E	1	1	Half	0.25	15	Open, Short, Idle	✓	256	✓				NSOIC-8
SP3073E	1	1	Full	0.5	15	Open, Short, Idle	✓	256	✓				NSOIC-14
SP3074E	1	1	Full	0.5	15	Open, Short, Idle		256					NSOIC-8
SP3075E	1	1	Half	0.5	15	Open, Short, Idle	✓	256	✓				NSOIC-8
SP3076E	1	1	Full	16	15	Open, Short, Idle	✓	256	✓				NSOIC-14
SP3077E	1	1	Full	16	15	Open, Short, Idle		256					NSOIC-8
SP3078E	1	1	Half	16	15	Open, Short, Idle	✓	256	✓				NSOIC-8
SP3483	1	1	Half	0.25	2	Open	✓	32					NSOIC-8
SP3485	1	1	Half	10	2	Open		32					NSOIC-8
SP3490	1	1	Full	10	2	Open		32					NSOIC-8
SP3491	1	1	Full	10	2	Open		32					NSOIC-14
SP3494	1	1	Half	2.5	2	Open	✓	32					NSOIC-8
SP3495E	1	1	Half	32	15	Open, Short, Idle	✓	64					NSOIC-8
SP3496E	1	1	Full	32	15	Open, Short, Idle		64					NSOIC-8
SP3497E	1	1	Full	32	15	Open, Short, Idle	✓	64					NSOIC-14

5.0V RS-485/422 Transceivers

Name	Drivers	Receivers	Duplex	Data Rate (Mbps)	ESD (kV)	Rx Fail-Safe	Shutdown	Multi-Drop Nodes	Hot Swap	Transient Tolerance	Fault Tolerance	PROFIBUS	Packages
SP1481E	1	1	Half	20	15	Open	✓	32					NSOIC-8
SP1485E	1	1	Half	20	15	Open		32					NSOIC-8
SP1486E	1	1	Half	20	15	Open, Short, Idle		256	✓			✓	NSOIC-8
SP1490E	1	1	Full	20	15	Open		32					NSOIC-8
SP1491E	1	1	Full	20	15	Open	✓	32					NSOIC-14

5.0V RS-485/422 Transceivers													
Name	Drivers	Receivers	Duplex	Data Rate (Mbps)	ESD (kV)	Rx Fail-Safe	Shutdown	Multi-Drop Nodes	Hot Swap	Transient Tolerance	Fault Tolerance	PROFIBUS	Packages
SP3080E	1	1	Full	0.115	15	Open, Short, Idle	✓	256	✓	±65V			NSOIC-14
SP3081E	1	1	Full	0.115	15	Open, Short, Idle		256		±65V			NSOIC-8
SP3082E	1	1	Half	0.115	15	Open, Short, Idle	✓	256	✓	±65V			NSOIC-8
SP3083E	1	1	Full	0.5	15	Open, Short, Idle	✓	256	✓	±65V			NSOIC-14
SP3084E	1	1	Full	0.5	15	Open, Short, Idle		256		±65V			NSOIC-8
SP3085E	1	1	Half	0.5	15	Open, Short, Idle	✓	256	✓	±65V			NSOIC-8
SP3086E	1	1	Full	20	15	Open, Short, Idle	✓	256	✓	±65V			NSOIC-14
SP3087E	1	1	Full	20	15	Open, Short, Idle		256		±65V			NSOIC-8
SP3088E	1	1	Half	20	15	Open, Short, Idle	✓	256	✓	±65V			NSOIC-8
XR3080X	1	1	Full	0.25	15	Open, Short, Idle	✓	256	✓	±70V	±18V	✓	NSOIC-14
XR3081X	1	1	Full	0.25	15	Open, Short, Idle	✓	256	✓	±70V	±18V	✓	NSOIC-8
XR3082X	1	1	Half	0.25	15	Open, Short, Idle	✓	256	✓	±70V	±18V	✓	NSOIC-8
XR3083X	1	1	Full	1	15	Open, Short, Idle	✓	256	✓	±70V	±18V	✓	NSOIC-14
XR3084X	1	1	Full	1	15	Open, Short, Idle	✓	256	✓	±70V	±18V	✓	NSOIC-8
XR3085X	1	1	Half	1	15	Open, Short, Idle	✓	256	✓	±70V	±18V	✓	NSOIC-8
XR3086X	1	1	Full	20	15	Open, Short, Idle	✓	256	✓	±70V	±18V	✓	NSOIC-14
XR3087X	1	1	Full	20	15	Open, Short, Idle	✓	256	✓	±70V	±18V	✓	NSOIC-8
XR3088X	1	1	Half	20	15	Open, Short, Idle	✓	256	✓	±70V	±18V	✓	NSOIC-8
SP481E	1	1	Half	10	15	Open	✓	32					NSOIC-8
SP483	1	1	Half	0.25	2	Open	✓	32					NSOIC-8
SP483E	1	1	Half	0.25	15	Open	✓	32					NSOIC-8 PDIP-8
SP485	1	1	Half	5	2	Open		32					NSOIC-8 PDIP-8
SP485E	1	1	Half	10	15	Open		32					NSOIC-8 PDIP-8
SP485R	1	1	Half	1	2	Open		400					NSOIC-8 PDIP-8
SP486	4	0	Quad	10	2	No		32					WSOIC-16
SP487	4	0	Quad	10	2	No		32					WSOIC-16
SP490	1	1	Full	5	2	Open		32					NSOIC-8
SP490E	1	1	Full	10	15	Open		32					NSOIC-8 PDIP-8
SP491	1	1	Full	5	2	Open	✓	32					NSOIC-14
SP491E	1	1	Full	10	15	Open	✓	32					NSOIC-14 PDIP-14
XR5486E	1	1	Full	52	15	Open, Short, Idle	✓	256	✓	±65V		✓	NSOIC-14
XR5487E	1	1	Full	52	15	Open, Short, Idle		256		±65V		✓	NSOIC-8
XR5488E	1	1	Half	52	15	Open, Short, Idle	✓	256	✓	±65V		✓	NSOIC-8

Exar offers a large portfolio of the RS-232 serial transceivers with more than 40 product offerings. The family consists of traditional RS-232 transceivers to the more advanced RS-232 transceivers with Auto On-line Plus features. In addition, many of the RS-232 transceivers have enhanced ESD protection. Exar offers new RS-232 products that meet rigid IEC 61000-4-2 Air-Gap and Contact ESD standards. This protection makes the product immune to damage from ESD strikes. Many of the devices are drop-in replacements and functional equivalents to existing industry standard solutions.

RS-232 Transceivers										
Name	Drivers	Receivers	Data Rate (kbps)	ESD (kV)	Shutdown	TTL Tri-state	Auto On-Line	Auto On-Line Plus	Supply Voltage Range	Packages
SP202E	2	2	120	15					4.5V-5.5V	NSOIC-16 PDIP-16 WSOIC-16
SP206	4	3	120	10	✓	✓			4.5V-5.5V	SSOP-24 WSOIC-24
SP207	5	3	120	10					4.5V-5.5V	SSOP-24
SP207E	5	3	120	15					4.5V-5.5V	SSOP-24
SP208	4	4	120	10					4.5V-5.5V	SSOP-24 WSOIC-24
SP208E	4	4	120	15					4.5V-5.5V	SSOP-24 WSOIC-24
SP211	4	5	120	10	✓	✓			4.5V-5.5V	SSOP-28 WSOIC-28
SP211E	4	5	120	15	✓	✓			4.5V-5.5V	SSOP-28 WSOIC-28
SP211EH	4	5	460	15	✓	✓			4.5V-5.5V	SSOP-28 WSOIC-28
SP213E	4	5	120	15	✓	✓			4.5V-5.5V	SSOP-28
SP213EH	4	5	460	15	✓	✓			4.5V-5.5V	SSOP-28
SP2209E	6	10	460	15					10.8V-13.2V 3.125V-5.5V	TSSOP-38
SP232A	2	2	120	2					4.5V-5.5V	NSOIC-16 PDIP-16 WSOIC-16
SP232E	2	2	120	15					4.5V-5.5V	NSOIC-16 PDIP-16 WSOIC-16
SP233A	2	2	120	2					4.5V-5.5V	WSOIC-20 PDIP-20
SP233E	2	2	120	15					4.5V-5.5V	WSOIC-20
SP238A	4	4	20	2					4.5V-5.5V	WSOIC-24
SP310A	2	2	120	2	✓				4.5V-5.5V	WSOIC-18 PDIP-18
SP310E	2	2	120	15	✓				4.5V-5.5V	WSOIC-18 PDIP-18
SP312A	2	2	120	2	✓	✓			4.5V-5.5V	WSOIC-18
SP312E	2	2	120	15	✓	✓			4.5V-5.5V	WSOIC-18
SP3203E	3	2	250	15	✓				3V-5.5V	TSSOP-20
SP3220E	1	1	120	15	✓	✓			3V-5.5V	SSOP-16 TSSOP-16
SP3220EB	1	1	250	15	✓	✓			3V-5.5V	SSOP-16 TSSOP-16
SP3220EU	1	1	1000	15	✓	✓			3V-5.5V	SSOP-16 TSSOP-16

RS-232 Transceivers										
Name	Drivers	Receivers	Data Rate (kbps)	ESD (kV)	Shutdown	TTL Tri-state	Auto On-Line	Auto On-Line Plus	Supply Voltage Range	Packages
SP3221E	1	1	250	15	✓	✓	✓		3V-5.5V	TSSOP-20
SP3222E	2	2	120	15	✓	✓			3V-5.5V	SSOP-20 WSOIC-18 TSSOP-20
SP3222EB	2	2	250	15	✓	✓			3V-5.5V	SSOP-20 WSOIC-18 TSSOP-20
SP3222EU	2	2	1000	15	✓	✓			3V-5.5V	SSOP-20 WSOIC-18 TSSOP-20
SP3223E	2	2	120	15	✓	✓	✓		3V-5.5V	SSOP-20 TSSOP-20
SP3223EB	2	2	250	15	✓	✓	✓		3V-5.5V	SSOP-20 TSSOP-20
SP3223EU	2	2	1000	15	✓	✓	✓		3V-5.5V	SSOP-20 TSSOP-20
SP3224E	2	2	250	15	✓	✓		✓	3V-5.5V	SSOP-20 TSSOP-20
SP3225E	2	2	1000	15	✓	✓		✓	3V-5.5V	SSOP-20 TSSOP-20
SP3226E	1	1	250	15	✓			✓	3V-5.5V	SSOP-16 TSSOP-16
SP3227E	1	1	1000	15	✓			✓	3V-5.5V	SSOP-16 TSSOP-16
SP3232E	2	2	120	15					3V-5.5V	SSOP-16 TSSOP-16 NSOIC-16 WSOIC-16 PDIP-16
SP3232EB	2	2	250	15					3V-5.5V	SSOP-16 TSSOP-16 NSOIC-16 WSOIC-16
SP3232EH	2	2	460	15					3V-5.5V	TSSOP-16
SP3232EU	2	2	1000	15					3V-5.5V	SSOP-16 TSSOP-16 NSOIC-16 WSOIC-16 PDIP-16
SP3238E	5	3	250	15	✓		✓		3V-5.5V	SSOP-28 TSSOP-28
SP3239E	5	3	250	15	✓				3V-5.5V	SSOP-28
SP3243E	3	5	120	15	✓		✓		3V-5.5V	SSOP-28 TSSOP-28
SP3243EB	3	5	250	15	✓		✓		3V-5.5V	SSOP-28 WSOIC-28 TSSOP-28 QFN32
SP3243EH	3	5	460	15	✓		✓		3V-5.5V	SSOP-28 WSOIC-28
SP3243EU	3	5	1000	15	✓		✓		3V-5.5V	SSOP-28 WSOIC-28 TSSOP-28 QFN32
SP3244E	3	5	250	15	✓			✓	3V-5.5V	SSOP-28 TSSOP-28 QFN32
SP3245E	3	5	1000	15	✓			✓	3V-5.5V	SSOP-28 TSSOP-28 QFN32
SP3249E	5	3	250	15					3V-5.5V	TSSOP-24
SP385E	2	2	120	15	✓				3.3V or 5V	SSOP-20 WSOIC-18



A New Direction in Mixed-Signal

LIFE SUPPORT POLICY

EXAR Corporation does not recommend the use of its products in life support applications where the failure or malfunction of the product can reasonably be expected to cause failure of a life support system or to significantly affect its safety or effectiveness. Life support devices or systems are devices or systems which are intended for surgical implant into the body, or support or sustain life, and where failure to perform when properly used in accordance with instructions for use provided in the labeling can be reasonably expected to result in death or significant injury to the user. Products are not authorized for use in such applications unless EXAR Corporation receives, in writing, assurances to its satisfaction that: (a) the risk of injury or damage has been minimized; (b) the user assumes all such risks; (c) potential liability and indemnity of EXAR Corporation is adequately protected under the circumstances.

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Exar Corporation's products are protected under one or more of the following U.S. Patents:

3,306,444, 3,883,889, 4,042,953, 4,152,823, 4,247,951, 4,265,935, 4,318,118, 4,566,914, 4,617,535, 4,771,188, 4,789,838, 4,851,893, 4,866,397, 4,949,150, 4,975,386, 5,007,081, 5,011,784, 5,016,080, 5,023,194, 5,068,702, 5,097,309, 5,148,395, 5,152,842, 5,190,884, 5,229,664, 5,247,581, 5,248,624, 5,283,579, 5,294,927, 5,298,814, 5,315,264, 5,319,704, 5,325,045, 5,325,069, 5,357,379, 5,371,419, 5,387,877, 5,389,829, 5,440,254, 5,444,242, 5,446,412, 5,452,711, 5,502,746, 5,506,532, 5,512,816, 5,552,732, 5,557,481, 5,570,049, 5,572,212, 5,587,684, 5,592,167, 5,604,452, 5,625,281, 5,648,972, 5,650,747, 5,689,259, 5,694,031, 5,698,970, 5,703,524, 5,708,536, 5,790,393, 5,796,361, 5,649,122, 5,801,587, 5,801,593, 5,805,005, 5,818,271, 5,528,330, 5,844,431, 5,852,360, 5,864,257, 5,870,002, 5,880,690, 5,880,632, 5,910,739, 5,914,627, 5,914,632, 5,923,203, 5,923,206, 5,929,799, 5,933,056, 5,949,787, 5,959,494, 6,031,389, 6,121,805, 6,121,837, 6,127,956, 6,300,820, 6,311,246, 6,313,671, 6,313,672, 6,323,703, 6,323,820, 6,326,820, 6,333,651, 6,340,944, 6,350,979, 6,351,165, 6,359,484, 6,404,927, 6,424,197, 6,424,510, 6,452,248, 6,452,425, 6,462,695, 6,501,320, 6,747,503, 6,754,839, 6,774,942, 6,798,857, 6,865,626, 6,947,999, 9,952,240, 6,960,942, 6,695,606, 7,000,158, 7,012,794, 7,038,720, 7,057,241

THERE ARE OTHER U.S. AND FOREIGN PATENTS PENDING.

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